



United States  
Department of  
Agriculture



Natural  
Resources  
Conservation  
Service

In cooperation with  
Virginia Polytechnic  
Institute and State  
University

# Soil Survey of Tidewater Cities Area, Virginia









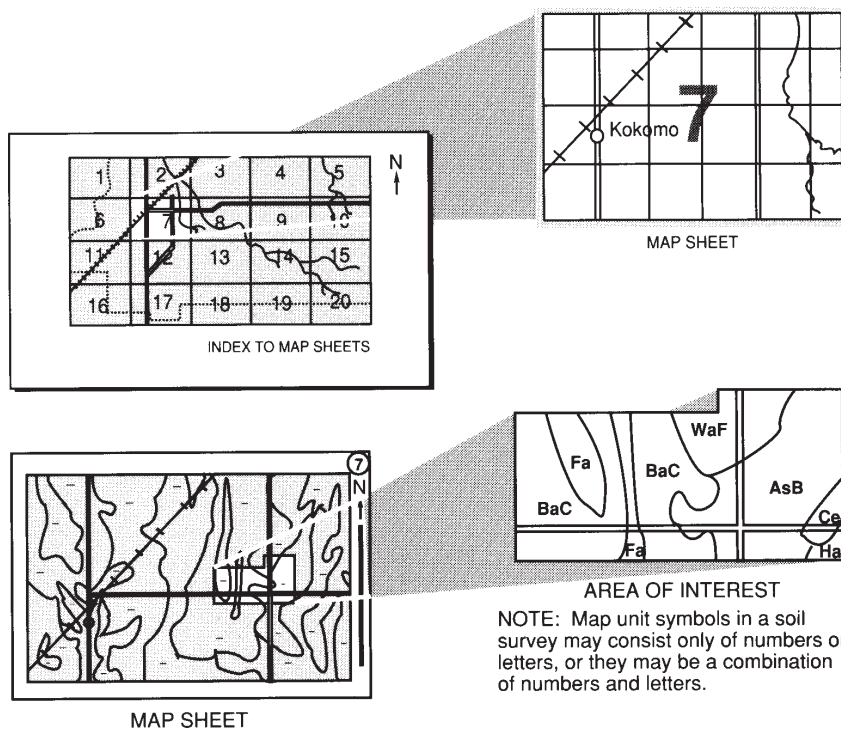
# How To Use This Soil Survey

The detailed soil maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and go to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Go to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.





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## National Cooperative Soil Survey

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey. This survey was made cooperatively by the Natural Resources Conservation Service and the Virginia Polytechnic Institute and State University. Financial assistance was provided by the Virginia Department of Conservation and Recreation and the Hampton Roads Planning District Commission.

Major fieldwork for this soil survey was completed in 1995. Soil names and descriptions were approved in 1995. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1995. The most current official data are available on the Internet at <http://websoilsurvey.nrcs.usda.gov>.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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## Cover Caption

A view from the city of Portsmouth looking across the Southern Branch of the Elizabeth River into the city of Norfolk.

*Additional information about the Nation's natural resources is available online from the Natural Resources Conservation Service at <http://www.nrcs.usda.gov>.*



# Contents

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<b>Cover</b> .....	i
<b>How To Use This Soil Survey</b> .....	iii
<b>Contents</b> .....	v
<b>Foreword</b> .....	ix
<b>Introduction</b> .....	1
Climate .....	1
How This Survey Was Made .....	2
<b>Detailed Soil Map Units</b> .....	5
1—Altavista-Urban land complex, 0 to 3 percent slopes .....	6
2—Augusta-Urban land complex, 0 to 2 percent slopes .....	7
3—Axis very fine sandy loam, 0 to 2 percent slopes, very frequently flooded .....	9
4—Beaches .....	10
5—Bethera-Urban land complex, 0 to 2 percent slopes .....	11
6—Bohicket muck, 0 to 1 percent slopes, very frequently flooded .....	12
7—Bojac-Urban land complex, 0 to 3 percent slopes .....	14
8—Chickahominy-Urban land complex, 0 to 2 percent slopes .....	15
9A—Craven-Urban land complex, 0 to 2 percent slopes .....	17
9B—Craven-Urban land complex, 2 to 6 percent slopes .....	18
10—Dragston-Urban land complex, 0 to 2 percent slopes .....	20
11—Duckston fine sand, 0 to 2 percent slopes, frequently flooded .....	22
12—Johnston silt loam, 0 to 2 percent slopes, frequently flooded .....	23
13—Lawnes loam, 0 to 1 percent slopes, very frequently flooded .....	24
14—Levy silty clay, 0 to 2 percent slopes, very frequently flooded .....	26
15—Munden-Urban land complex, 0 to 3 percent slopes .....	28
16C—Nevarc-Uchee complex, 6 to 15 percent slopes .....	29
16D—Nevarc-Uchee complex, 15 to 50 percent slopes .....	31
17—Newflat-Urban land complex, 0 to 2 percent slopes .....	34
18—Nimmo-Urban land complex, 0 to 2 percent slopes .....	35
19—Peawick-Urban land complex, 0 to 3 percent slopes .....	37
20—Seabrook-Urban land complex, 0 to 2 percent slopes .....	39
21A—Slagle-Urban land complex, 0 to 2 percent slopes .....	40
21B—Slagle-Urban land complex, 2 to 6 percent slopes .....	42
22—State-Urban land complex, 0 to 3 percent slopes .....	44
23—Suffolk fine sandy loam, 2 to 6 percent slopes .....	45
24—Tomotley-Urban land complex, 0 to 2 percent slopes .....	46
25—Uchee loamy fine sand, 2 to 6 percent slopes .....	48
26—Udorthents-Dumps complex .....	49
27—Urban land .....	50
28—Yemassee-Urban land complex, 0 to 2 percent slopes .....	50
DAM—Dam .....	52
W—Water .....	52
<b>Use and Management of the Soils</b> .....	53
Interpretive Ratings .....	53
Rating Class Terms .....	53
Numerical Ratings .....	53



---

Pasture .....	54
Yields per Acre .....	54
Land Capability Classification .....	54
Virginia Soil Management Groups .....	55
Prime Farmland .....	57
Hydric Soils .....	57
Forestland Productivity and Management .....	59
Forestland Productivity .....	59
Forestland Management .....	59
Recreational Development .....	61
Engineering .....	63
Building Site Development .....	63
Sanitary Facilities .....	65
Construction Materials .....	67
Water Management .....	68
<b>Soil Properties</b> .....	71
Engineering Properties .....	71
Physical Soil Properties .....	72
Chemical Soil Properties .....	74
Water Features .....	74
Soil Features .....	76
<b>Classification of the Soils</b> .....	77
Soil Series and Their Morphology .....	77
Altavista Series .....	78
Augusta Series .....	80
Axis Series .....	82
Bethera Series .....	83
Bohicket Series .....	85
Bojac Series .....	86
Chickahominy Series .....	88
Craven Series .....	89
Dragston Series .....	92
Duckston Series .....	94
Johnston Series .....	95
Lawnes Series .....	96
Levy Series .....	97
Munden Series .....	99
Nevarc Series .....	101
Newflat Series .....	103
Nimmo Series .....	105
Peawick Series .....	106
Seabrook Series .....	108
Slagle Series .....	110
State Series .....	112
Suffolk Series .....	114



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Tomotley Series .....	116
Uchee Series .....	118
Yemassee Series .....	120
<b>Formation of the Soils</b> .....	123
Factors of Soil Formation .....	123
Processes of Soil Horizon Differentiation .....	126
<b>References</b> .....	127
<b>Glossary</b> .....	129
<b>Tables</b> .....	141
Table 1.—Temperature and Precipitation .....	142
Table 2.—Freeze Dates in Spring and Fall .....	143
Table 3.—Growing Season .....	143
Table 4.—Acreage and Proportionate Extent of the Soils .....	144
Table 5.—Land Capability, Virginia Soil Management Group, and Yields per Acre .....	145
Table 6.—Prime Farmland .....	148
Table 7.—Hydric Soils List .....	148
Table 8.—Forestland Productivity .....	149
Table 9.—Forestland Management, Part I .....	153
Table 9.—Forestland Management, Part II .....	157
Table 9.—Forestland Management, Part III .....	160
Table 9.—Forestland Management, Part IV .....	163
Table 9.—Forestland Management, Part V .....	166
Table 10.—Recreation, Part I .....	170
Table 10.—Recreation, Part II .....	174
Table 11.—Building Site Development, Part I .....	178
Table 11.—Building Site Development, Part II .....	182
Table 12.—Sanitary Facilities, Part I .....	186
Table 12.—Sanitary Facilities, Part II .....	191
Table 13.—Construction Materials, Part I .....	196
Table 13.—Construction Materials, Part II .....	200
Table 14.—Water Management .....	204
Table 15.—Engineering Properties .....	208
Table 16.—Physical Soil Properties .....	216
Table 17.—Chemical Soil Properties .....	221
Table 18.—Water Features .....	224
Table 19.—Soil Features .....	229
Table 20.—Taxonomic Classification of the Soils .....	232

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# Foreword

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Soil surveys contain information that affects land use planning in survey areas. They include predictions of soil behavior for selected land uses. The surveys highlight soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

Soil surveys are designed for many different users. Farmers, ranchers, foresters, and agronomists can use the surveys to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the surveys to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the surveys to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://soils.usda.gov/sqi/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<http://offices.sc.egov.usda.gov/locator/app?agency—nrsc>) or your NRCS State Soil Scientist ([http://soils.usda.gov/contact/state\\_offices/](http://soils.usda.gov/contact/state_offices/)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. The location of each map unit is shown on the detailed soil maps. Each soil in the survey area is described, and information on specific uses is given. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

John A. Bricker  
State Conservationist  
Natural Resources Conservation Service







# Soil Survey of Tidewater Cities Area, Virginia

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United States Department of Agriculture, Natural Resources Conservation Service,  
in cooperation with  
Virginia Polytechnic Institute and State University

The TIDEWATER CITIES AREA is located in the eastern part of Virginia (fig. 1). It makes up 226,373 acres, or 385 square miles. The survey area includes the cities of Hampton, Newport News, Norfolk, Poquoson, and Portsmouth. It is bounded on the north by James City County and York County, on the west by the city of Suffolk, on the east by the city of Virginia Beach, and on the south by the city of Chesapeake.

Fort Eustis has not been mapped as part of this soil survey. All other Federal land within the cities has been mapped as part of this soil survey.

## Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Langley Air Force Base, Virginia, in the period 1971 to 2000. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on the length of the growing season.

In winter, the average temperature is 42.0 degrees F and the average daily minimum temperature is 34.0 degrees. The lowest temperature on record, which occurred on January 21, 1985, is -3 degrees. In summer, the average temperature is 77.3 degrees and the average daily maximum temperature is 84.8 degrees. The highest recorded temperature, which occurred on August 1, 1980, is 105 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 47.44 inches. Of this, 31.64 inches, or about 67 percent, usually falls in April through November. The growing season for most crops falls within this period. The heaviest 1-day rainfall during the period of record was 6.51 inches on September 21, 1972. Thunderstorms occur on about 37 days each year, and most occur in July.

The average seasonal snowfall is 6.1 inches. The greatest snow depth at any one time during the period of record was 13 inches on February 19, 1989. The heaviest 1-day snowfall on record was 12.2 inches on February 18, 1989. On the average, 4 days



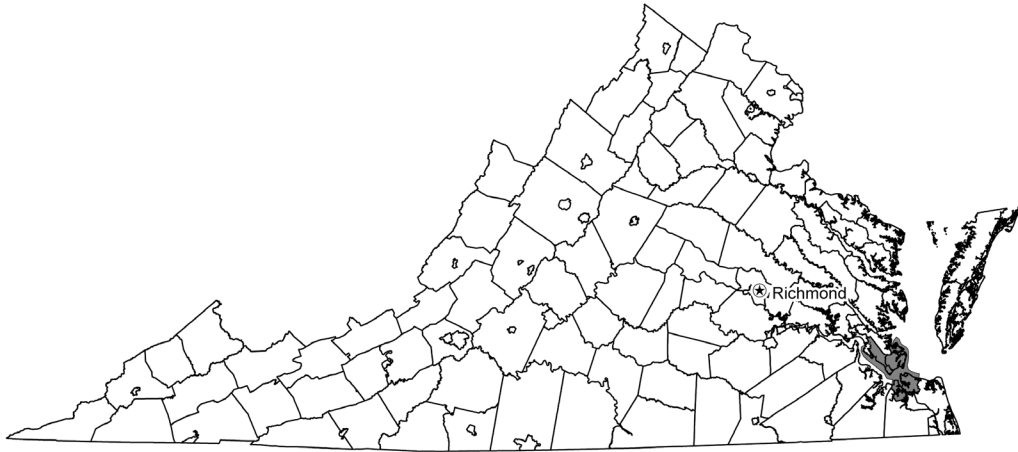


Figure 1.—Location of Tidewater Cities Area in Virginia.

of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 57 percent. Humidity is higher at night, and the average at dawn is about 78 percent. The sun shines 64 percent of the time possible in summer and 54 percent in winter. The prevailing wind is from the west-southwest. Average windspeed is highest, 11.3 miles per hour, in March and April.

## How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRAs.

The soils and miscellaneous areas in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil



scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.







# Detailed Soil Map Units

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The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The contrasting components are mentioned in the map unit descriptions. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. The soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For



example, Suffolk fine sandy loam, 2 to 6 percent slopes, is a phase of the Suffolk series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Nevarc-Uchee complex, 6 to 15 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Udorthents-Dumps complex is an example.

Table 4 lists the map units in this survey area. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

## **1—Altavista-Urban land complex, 0 to 3 percent slopes**

### ***Setting***

*Major land resource area:* Tidewater Area (MLRA 153B)

*Landform:* Marine terraces

*Position on the landform:* Nearly level, medium to broad rises

*Shape and size of areas:* Irregular; 5 to 15 acres

### ***Map Unit Composition***

Altavista and similar soils: Typically 65 percent, ranging from about 50 to 90 percent

Urban land and similar areas: Typically 20 percent, ranging from about 10 to 95 percent

### ***Typical Profile***

#### **Altavista**

*Surface layer:*

0 to 11 inches—dark grayish brown fine sandy loam

*Subsoil:*

11 to 16 inches—light yellowish brown loam

16 to 28 inches—light olive brown loam

28 to 37 inches—light olive brown clay loam; gray iron depletions

37 to 49 inches—yellowish brown and strong brown loam; gray iron depletions

49 to 62 inches—gray sandy clay loam; light olive brown and yellowish brown masses of oxidized iron

*Substratum:*

62 to 74 inches—gray stratified fine sandy loam to loamy fine sand to fine sand; yellowish brown masses of oxidized iron

#### **Urban land**

Urban land consists of areas covered by impervious material, such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers. No interpretations are given for Urban land.

### ***Minor Components***

*Dissimilar:*

- The somewhat poorly drained Augusta and Newflat soils; in slight depressions
- The poorly drained Chickahominy soils; in slight depressions



*Similar:*

- The well drained State soils; in the slightly higher areas

***Properties and Qualities of the Altavista Soil***

*Available water capacity:* High (about 9.6 inches)

*Slowest saturated hydraulic conductivity:* Moderately high (about 0.57 in/hr)

*Drainage class:* Moderately well drained

*Depth to seasonal water saturation:* About 1.5 to 2.5 feet

*Water table kind:* Apparent

*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* Low

*Runoff class:* Low

*Parent material:* Loamy fluviomarine deposits

***Use and Management Considerations***

**Pasture**

- This map unit is well suited to pasture.

**Woodland**

*Suitability:* Well suited to loblolly pine; moderately suited to southern red oak

- The low strength of the soil interferes with the construction of haul roads and log landings.
- The low strength of the soil may create unsafe conditions for log trucks.

**Building sites**

- The seasonal high water table may restrict the period when excavations can be made.

**Septic tank absorption fields**

- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.

**Local roads and streets**

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- The low strength of the soil may cause structural damage to local roads and streets.

***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Altavista—2w; Urban land—8s

*Virginia soil management group:* Altavista—B; Urban land—none assigned

*Hydric soils:* No

**2—Augusta-Urban land complex, 0 to 2 percent slopes**

***Setting***

*Major land resource area:* Tidewater Area (MLRA 153B)

*Landform:* Marine terraces

*Position on the landform:* Nearly level, medium to broad flats

*Shape and size of areas:* Irregular; 5 to 15 acres

***Map Unit Composition***

Augusta and similar soils: Typically 60 percent, ranging from about 50 to 90 percent



Urban land and similar areas: Typically 20 percent, ranging from about 10 to 95 percent

### ***Typical Profile***

#### **Augusta**

##### *Surface layer:*

0 to 8 inches—brown fine sandy loam

##### *Subsurface layer:*

8 to 13 inches—pale brown sandy loam; gray iron depletions

##### *Subsoil:*

13 to 27 inches—light olive brown sandy clay loam; light gray iron depletions

27 to 40 inches—light gray sandy loam; olive brown masses of oxidized iron

##### *Substratum:*

40 to 51 inches—grayish brown gravelly loamy sand; light gray iron depletions and reddish brown masses of oxidized iron

51 to 72 inches—light brownish gray stratified loamy sand to gravelly loamy sand; strong brown masses of oxidized iron

#### **Urban land**

Urban land consists of areas covered by impervious material, such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers. No interpretations are given for Urban land.

### ***Minor Components***

##### *Dissimilar:*

- The somewhat poorly drained Dragston soils; in landscape positions similar to those of the Augusta soil
- The poorly drained Nimmo and Tomotley soils; in areas around small drainageways and in depressions
- Soils that have water on the surface for brief periods after heavy or prolonged rainfall

##### *Similar:*

- The moderately well drained Munden and Seabrook soils; on the slightly higher rises

### ***Properties and Qualities of the Augusta Soil***

*Available water capacity:* Moderate (about 7.1 inches)

*Slowest saturated hydraulic conductivity:* Moderately high (about 0.57 in/hr)

*Drainage class:* Somewhat poorly drained

*Depth to seasonal water saturation:* About 1.0 to 2.0 feet

*Water table kind:* Apparent

*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* Low

*Runoff class:* Very high

*Parent material:* Loamy fluviomarine deposits

### ***Use and Management Considerations***

#### **Pasture**

*Suitability:* Moderately suited to pasture

- The seasonal high water table can affect equipment use, grazing patterns, and the viability of grass and legume species.



### **Woodland**

*Suitability:* Well suited to loblolly pine and southern red oak; moderately suited to sweetgum

- Wetness may limit the use of log trucks.
- This map unit is well suited to haul roads and log landings.

### **Building sites**

- The seasonal high water table may restrict the period when excavations can be made.
- The high content of sand or gravel in the soil increases sloughing and causes cutbanks to be more susceptible to caving.

### **Septic tank absorption fields**

- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.

### **Local roads and streets**

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- The low strength of the soil may cause structural damage to local roads and streets.

### ***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Augusta—4w; Urban land—8s

*Virginia soil management group:* Augusta—Z; Urban land—none assigned

*Hydric soils:* No

## **3—Axis very fine sandy loam, 0 to 2 percent slopes, very frequently flooded**

### ***Setting***

*Major land resource area:* Tidewater Area (MLRA 153B)

*Landform:* Coastal Plain salt marshes

*Position on the landform:* Nearly level, low-lying salt marshes

*Shape and size of areas:* Irregular; 5 to 25 acres

### ***Map Unit Composition***

Axis and similar soils: Typically 90 percent, ranging from about 80 to 100 percent

### ***Typical Profile***

*Surface layer:*

0 to 14 inches—very dark grayish brown very fine sandy loam

*Substratum:*

14 to 35 inches—gray very fine sandy loam; dark yellowish brown and olive masses of oxidized iron

35 to 50 inches—dark gray fine sandy loam; olive masses of oxidized iron

50 to 70 inches—gray and light olive brown fine sandy loam

### ***Minor Components***

*Dissimilar:*

- The very poorly drained Johnston soils; along smaller streams that are not flooded by tidal waters
- Beaches



*Similar:*

- The very poorly drained Bohicket soils; in landscape positions similar to those of the Axis soil

***Soil Properties and Qualities***

*Available water capacity:* Moderate (about 7.2 inches)

*Slowest saturated hydraulic conductivity:* Moderately high (about 0.57 in/hr)

*Drainage class:* Very poorly drained

*Depth to seasonal water saturation:* About 0 to 1.0 foot

*Water table kind:* Apparent

*Flooding hazard:* Very frequent

*Ponding hazard:* Frequent

*Depth of ponding:* 0.0 to 1.0 foot

*Shrink-swell potential:* Low

*Runoff class:* Negligible

*Parent material:* Loamy fluviomarine deposits

***Use and Management Considerations***

**Pasture**

- This soil is unsuited to pasture.

**Woodland**

- This soil is unsuited to woodland.

**Building sites**

- Flooding and ponding are limitations affecting building site development.

**Septic tank absorption fields**

- Flooding and ponding are limitations affecting septic tank absorption fields.
- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.

**Local roads and streets**

- Flooding may damage local roads and streets.
- Ponding affects the ease of excavation and grading and limits the bearing capacity of the soil.

***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* 7w

*Virginia soil management group:* PP

*Hydric soil:* Yes

**4—Beaches**

***Setting***

*Major land resource area:* Tidewater Area (MLRA 153B)

*Landform:* Coastal Plain beaches

*Position on the landform:* Beaches

*Shape and size of areas:* Long and narrow; 5 to 25 acres

***Map Unit Composition***

Beaches and similar soils: Typically 95 percent, ranging from about 80 to 100 percent



### ***Use and Management Considerations***

Onsite investigation is needed to determine the suitability for specific uses.

### ***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* 8w

*Virginia soil management group:* None assigned

*Hydric soils:* No

## **5—Bethera-Urban land complex, 0 to 2 percent slopes**

### ***Setting***

*Major land resource area:* Atlantic Coast Flatwoods (MLRA 153A)

*Landform:* Uplands

*Position on the landform:* Nearly level, medium to broad flats and depressions

*Shape and size of areas:* Irregular; 5 to 30 acres

*Note:* Some small areas of this map unit are undeveloped

### ***Map Unit Composition***

Bethera and similar soils: Typically 70 percent, ranging from about 60 to 90 percent

Urban land and similar areas: Typically 20 percent, ranging from about 10 to 70 percent

### ***Typical Profile***

#### **Bethera**

##### *Surface layer:*

0 to 4 inches—dark gray silt loam

4 to 7 inches—dark gray silt loam; yellowish brown masses of oxidized iron

##### *Subsurface layer:*

7 to 12 inches—gray silt loam; strong brown masses of oxidized iron

12 to 40 inches—light gray clay loam; yellowish brown, strong brown, and yellowish red masses of oxidized iron

40 to 72 inches—light gray clay loam; dark yellowish brown and strong brown masses of oxidized iron

#### **Urban land**

Urban land consists of areas covered by impervious material, such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers. No interpretations are given for Urban land.

### ***Minor Components***

##### *Dissimilar:*

- The moderately well drained Slagle soils; in the slightly higher areas

##### *Similar:*

- Soils that have water on the surface throughout early summer
- Soils that are at the base of escarpments and have less clay than the Bethera soil
- Soils that have a solum that is thinner than that of the Bethera soil

### ***Properties and Qualities of the Bethera Soil***

*Available water capacity:* High (about 9.3 inches)

*Slowest saturated hydraulic conductivity:* Moderately low (about 0.06 in/hr)

*Drainage class:* Poorly drained



*Depth to seasonal water saturation:* At the surface

*Water table kind:* Apparent

*Flooding hazard:* None

*Ponding hazard:* Occasional

*Depth of ponding:* 0.0 to 1.0 foot

*Shrink-swell potential:* Moderate

*Runoff class:* Negligible

*Parent material:* Clayey marine sediments

### ***Use and Management Considerations***

#### **Pasture**

- This map unit is unsuited to pasture.

#### **Woodland**

*Suitability:* Moderately suited to sweetgum

- Ponding restricts the safe use of roads by log trucks.
- Wetness may limit the use of log trucks.
- The low strength of the soil interferes with the construction of haul roads and log landings.
- The low strength of the soil may create unsafe conditions for log trucks.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.

#### **Building sites**

- Ponding is a limitation affecting building site development.

#### **Septic tank absorption fields**

- Ponding is a limitation affecting septic tank absorption fields.
- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.

#### **Local roads and streets**

- Ponding affects the ease of excavation and grading and limits the bearing capacity of the soil.
- Shrinking and swelling restrict the use of the soil as base material for local roads and streets.
- The low strength of the soil is unfavorable for supporting heavy loads.

### ***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Bethera—6w; Urban land—8s

*Virginia soil management group:* Bethera—OO; Urban land—none assigned

*Hydric soils:* Bethera—yes; Urban land—no

## **6—Bohicket muck, 0 to 1 percent slopes, very frequently flooded**

### ***Setting***

*Major land resource area:* Tidewater Area (MLRA 153B)

*Landform:* Tidal marshes

*Position on the landform:* Flood plains

*Shape and size of areas:* Long and winding or very broad; 3 to more than 100 acres

### ***Map Unit Composition***

Bohicket and similar soils: Typically 90 percent, ranging from about 70 to 95 percent



### ***Typical Profile***

*Surface layer:*

0 to 8 inches—gray silty clay loam; muck

*Substratum:*

8 to 29 inches—dark greenish gray silty clay loam

29 to 65 inches—dark greenish gray silty clay

### ***Minor Components***

*Dissimilar:*

- The very poorly drained Johnston soils; along small streams at the upper end of the flood plain and in areas that are not flooded by tidal waters

*Similar:*

- The very poorly drained Axis soils; in landscape positions similar to those of the Bohicket soil

### ***Soil Properties and Qualities***

*Available water capacity:* Moderate (about 7.8 inches)

*Slowest saturated hydraulic conductivity:* Low (about 0.00 in/hr)

*Drainage class:* Very poorly drained

*Depth to seasonal water saturation:* At the surface

*Water table kind:* Apparent

*Flooding hazard:* Very frequent

*Ponding hazard:* Frequent

*Depth of ponding:* 0.0 to 3.0 feet

*Shrink-swell potential:* High

*Runoff class:* Negligible

*Parent material:* Loamy and clayey alluvial sediments

### ***Use and Management Considerations***

#### **Pasture**

- This soil is unsuited to pasture.

#### **Woodland**

- This soil is unsuited to woodland.

#### **Building sites**

- Flooding and ponding are limitations affecting building site development.

#### **Septic tank absorption fields**

- Flooding and ponding are limitations affecting septic tank absorption fields.
- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.

#### **Local roads and streets**

- Flooding may damage local roads and streets.
- Ponding affects the ease of excavation and grading and limits the bearing capacity of the soil.
- Shrinking and swelling restrict the use of the soil as base material for local roads and streets.
- The low strength of the soil is unfavorable for supporting heavy loads.

### ***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* 8w



*Virginia soil management group:* PP

*Hydric soil:* Yes

## **7—Bojac-Urban land complex, 0 to 3 percent slopes**

### ***Setting***

*Major land resource area:* Tidewater Area (MLRA 153B)

*Landform:* Marine terraces

*Position on the landform:* Nearly level, medium to broad rises

*Shape and size of areas:* Irregular; 5 to 40 acres

### ***Map Unit Composition***

Bojac and similar soils: Typically 60 percent, ranging from about 50 to 90 percent

Urban land and similar areas: Typically 30 percent, ranging from about 10 to 95 percent

### ***Typical Profile***

#### **Bojac**

*Surface layer:*

0 to 10 inches—dark brown loamy fine sand

*Subsoil:*

10 to 35 inches—brown sandy loam

*Substratum:*

35 to 70 inches—strong brown loamy sand

#### **Urban land**

Urban land consists of areas covered by impervious material, such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers. No interpretations are given for Urban land.

### ***Minor Components***

*Dissimilar:*

- The somewhat poorly drained Dragston soils; in swales and around poorly defined drainageways
- The moderately well drained Seabrook soils; in the slightly lower areas

*Similar:*

- The moderately well drained Munden soils; in the slightly lower areas
- Soils that are somewhat excessively drained
- Soils that have a surface layer that is thicker than that of the Bojac soil

### ***Properties and Qualities of the Bojac Soil***

*Available water capacity:* Low (about 5.1 inches)

*Slowest saturated hydraulic conductivity:* High (about 1.98 in/hr)

*Drainage class:* Well drained

*Depth to seasonal water saturation:* About 4.0 to 6.6 feet

*Water table kind:* Apparent

*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* Low

*Runoff class:* Very low

*Parent material:* Loamy and sandy fluviomarine deposits



### ***Use and Management Considerations***

#### **Pasture**

- This map unit is well suited to pasture.

#### **Woodland**

*Suitability:* Moderately suited to loblolly pine, southern red oak, and sweetgum

- This map unit is well suited to haul roads and log landings.
- This map unit is well suited to equipment operations.

#### **Building sites**

- The seasonal high water table may restrict the period when excavations can be made.
- The high content of sand or gravel in the soil increases sloughing and causes cutbanks to be more susceptible to caving.

#### **Septic tank absorption fields**

- Seepage limits the proper treatment of the effluent from conventional septic systems and may pollute the water table.

#### **Local roads and streets**

- This map unit is well suited to local roads and streets.

### ***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Bojac—2s; Urban land—8s

*Virginia soil management group:* Bojac—DD; Urban land—none assigned

*Hydric soils:* No

## **8—Chickahominy-Urban land complex, 0 to 2 percent slopes**

### ***Setting***

*Major land resource area:* Atlantic Coast Flatwoods (MLRA 153A) and Tidewater Area (MLRA 153B)

*Landform:* Stream terraces

*Position on the landform:* Nearly level, medium to broad flats, depressions, and drainageways

*Shape and size of areas:* Irregular; 5 to 50 acres

*Note:* Some small areas of this map unit are undeveloped

### ***Map Unit Composition***

Chickahominy and similar soils: Typically 80 percent, ranging from about 60 to 90 percent

Urban land and similar areas: Typically 15 percent, ranging from about 10 to 95 percent

### ***Typical Profile***

#### **Chickahominy**

*Surface layer:*

0 to 2 inches—dark grayish brown silt loam

*Subsurface layer:*

2 to 5 inches—dark grayish brown loam; light olive brown masses of oxidized iron



*Subsoil:*

5 to 35 inches—grayish brown clay; yellowish brown masses of oxidized iron

35 to 64 inches—gray clay; yellowish brown masses of oxidized iron

**Urban land**

Urban land consists of areas covered by impervious material, such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers. No interpretations are given for Urban land.

***Minor Components***

*Dissimilar:*

- The moderately well drained Altavista and Peawick soils; in the slightly higher areas
- The somewhat poorly drained Augusta soils; in the slightly higher areas

*Similar:*

- The somewhat poorly drained Newflat soils; in the slightly higher areas
- Soils that have a gravelly substratum
- Soils that have water on the surface during winter and early spring and during periods of prolonged rainfall
- Soils that have a solum less than 40 inches thick

***Properties and Qualities of the Chickahominy Soil***

*Available water capacity:* Moderate (about 8.9 inches)

*Slowest saturated hydraulic conductivity:* Low (about 0.00 in/hr)

*Drainage class:* Poorly drained

*Depth to seasonal water saturation:* About 0 to 0.5 foot

*Water table kind:* Apparent

*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* High

*Runoff class:* Very high

*Parent material:* Clayey alluvial sediments

***Use and Management Considerations***

**Pasture**

- This map unit is poorly suited to pasture.

**Building sites**

- The seasonal high water table may restrict the period when excavations can be made.
- Shrinking and swelling of the soil may crack foundations and basement walls.
- The high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

**Septic tank absorption fields**

- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.

**Local roads and streets**

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- Shrinking and swelling restrict the use of the soil as base material for local roads and streets.
- The low strength of the soil is unfavorable for supporting heavy loads.

***Interpretive Groups***

*Prime farmland:* Not prime farmland



*Land capability class:* Chickahominy—4w; Urban land—8s

*Virginia soil management group:* Chickahominy—LL; Urban land—none assigned

*Hydric soils:* Chickahominy—yes; Urban land—no

## **9A—Craven-Urban land complex, 0 to 2 percent slopes**

### ***Setting***

*Major land resource area:* Atlantic Coast Flatwoods (MLRA 153A)

*Landform:* Uplands

*Position on the landform:* Gently sloping, narrow to broad flats and narrow to medium rises

*Shape and size of areas:* Irregular; 5 to 15 acres

### ***Map Unit Composition***

Craven and similar soils: Typically 70 percent, ranging from about 60 to 90 percent

Urban land and similar areas: Typically 20 percent, ranging from about 10 to 95 percent

### ***Typical Profile***

#### **Craven**

*Surface layer:*

0 to 10 inches—dark grayish brown fine sandy loam

*Subsoil:*

10 to 22 inches—strong brown clay; red and yellowish brown masses of oxidized iron

22 to 36 inches—strong brown and yellowish brown clay; gray iron depletions and red and yellowish red masses of oxidized iron

36 to 45 inches—strong brown clay; gray iron depletions and reddish brown and yellowish red masses of oxidized iron

45 to 70 inches—light gray clay loam; reddish brown and strong brown masses of oxidized iron

#### **Urban land**

Urban land consists of areas covered by impervious material, such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers. No interpretations are given for Urban land.

### ***Minor Components***

*Dissimilar:*

- The well drained Uchee soils; in the higher areas

*Similar:*

- The moderately well drained Slagle soils; in landscape positions similar to those of the Craven soil

### ***Properties and Qualities of the Craven Soil***

*Available water capacity:* Moderate (about 8.4 inches)

*Slowest saturated hydraulic conductivity:* Moderately low (about 0.06 in/hr)

*Drainage class:* Moderately well drained

*Depth to seasonal water saturation:* About 2.0 to 3.0 feet

*Water table kind:* Apparent

*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* Moderate



*Runoff class:* Low

*Parent material:* Clayey marine sediments

### ***Use and Management Considerations***

#### **Pasture**

- This map unit is well suited to pasture.

#### **Woodland**

*Suitability:* Well suited to loblolly pine and southern red oak

- The low strength of the soil interferes with the construction of haul roads and log landings.
- The low strength of the soil may create unsafe conditions for log trucks.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- The stickiness of the soil restricts the use of equipment for site preparation to the drier periods.

#### **Building sites**

- The seasonal high water table may restrict the period when excavations can be made.
- The high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

#### **Septic tank absorption fields**

- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.
- The restricted permeability of the soil limits the absorption and proper treatment of the effluent from conventional septic systems.

#### **Local roads and streets**

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- Shrinking and swelling restrict the use of the soil as base material for local roads and streets.
- The low strength of the soil is unfavorable for supporting heavy loads.

### ***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Craven—2w; Urban land—8s

*Virginia soil management group:* Craven—HH; Urban land—none assigned

*Hydric soils:* No

## **9B—Craven-Urban land complex, 2 to 6 percent slopes**

### ***Setting***

*Major land resource area:* Atlantic Coast Flatwoods (MLRA 153A)

*Landform:* Uplands

*Position on the landform:* Gently sloping, narrow to broad flats and narrow to medium rises and side slopes

*Shape and size of areas:* Irregular; 5 to 15 acres

*Note:* Some small areas of this map unit are undeveloped

### ***Map Unit Composition***

Craven and similar soils: Typically 70 percent, ranging from about 60 to 90 percent

Urban land and similar areas: Typically 20 percent, ranging from about 10 to 95 percent



### ***Typical Profile***

#### **Craven**

##### *Surface layer:*

0 to 10 inches—dark grayish brown fine sandy loam

##### *Subsoil:*

10 to 22 inches—strong brown clay; red and yellowish brown masses of oxidized iron

22 to 36 inches—strong brown and yellowish brown clay; gray iron depletions and red and yellowish red masses of oxidized iron

36 to 45 inches—strong brown clay; gray iron depletions and reddish brown and yellowish red masses of oxidized iron

45 to 70 inches—light gray clay loam; reddish brown and strong brown masses of oxidized iron

#### **Urban land**

Urban land consists of areas covered by impervious material, such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers. No interpretations are given for Urban land.

### ***Minor Components***

##### *Dissimilar:*

- The well drained Uchee soils; in the higher areas

##### *Similar:*

- The moderately well drained Slagle soils; in landscape positions similar to those of the Craven soil

### ***Properties and Qualities of the Craven Soil***

*Available water capacity:* Moderate (about 8.4 inches)

*Slowest saturated hydraulic conductivity:* Moderately low (about 0.06 in/hr)

*Drainage class:* Moderately well drained

*Depth to seasonal water saturation:* About 2.0 to 3.0 feet

*Water table kind:* Apparent

*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* Moderate

*Runoff class:* Low

*Parent material:* Clayey marine sediments

### ***Use and Management Considerations***

#### **Pasture**

- This map unit is well suited to pasture.

#### **Woodland**

*Suitability:* Well suited to loblolly pine and southern red oak

- The low strength of the soil interferes with the construction of haul roads and log landings.
- The low strength of the soil may create unsafe conditions for log trucks.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- The stickiness of the soil restricts the use of equipment for site preparation to the drier periods.

#### **Building sites**

- The seasonal high water table may restrict the period when excavations can be made.



- The high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

**Septic tank absorption fields**

- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.
- The restricted permeability of the soil limits the absorption and proper treatment of the effluent from conventional septic systems.

**Local roads and streets**

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- Shrinking and swelling restrict the use of the soil as base material for local roads and streets.
- The low strength of the soil is unfavorable for supporting heavy loads.

***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Craven—2e; Urban land—8s

*Virginia soil management group:* Craven—HH; Urban land—none assigned

*Hydric soils:* No

**10—Dragston-Urban land complex, 0 to 2 percent slopes**

***Setting***

*Major land resource area:* Tidewater Area (MLRA 153B)

*Landform:* Marine terraces

*Position on the landform:* Nearly level, medium to broad flats

*Shape and size of areas:* Irregular; 5 to 10 acres

***Map Unit Composition***

Dragston and similar soils: Typically 70 percent, ranging from about 60 to 90 percent

Urban land and similar areas: Typically 20 percent, ranging from about 10 to 95 percent

***Typical Profile***

**Dragston**

*Surface layer:*

0 to 4 inches—very dark grayish brown fine sandy loam

*Subsurface layer:*

4 to 8 inches—pale brown fine sandy loam; gray iron depletions

*Subsoil:*

8 to 12 inches—pale brown and yellowish brown fine sandy loam

12 to 25 inches—gray fine sandy loam; yellowish brown masses of oxidized iron

25 to 35 inches—yellowish brown and brownish yellow loamy fine sand; gray iron depletions

*Substratum:*

35 to 45 inches—yellowish brown sand; light brownish gray iron depletions

45 to 54 inches—dark yellowish brown sand; brown iron depletions

54 to 64 inches—yellowish brown sand; grayish brown iron depletions

64 to 72 inches—dark yellowish brown sandy loam

72 to 75 inches—greenish gray sandy loam



### **Urban land**

Urban land consists of areas covered by impervious material, such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers. No interpretations are given for Urban land.

### ***Minor Components***

#### ***Dissimilar:***

- The moderately well drained Seabrook soils; in small, slightly higher convex areas
- The poorly drained Tomotley soils; in slight depressions

#### ***Similar:***

- The somewhat poorly drained Augusta soils; in landscape positions similar to those of the Dragston soil
- The poorly drained Nimmo soils; in slight depressions

### ***Properties and Qualities of the Dragston Soil***

*Available water capacity:* Low (about 5.4 inches)

*Slowest saturated hydraulic conductivity:* High (about 1.98 in/hr)

*Drainage class:* Somewhat poorly drained

*Depth to seasonal water saturation:* About 1.0 to 2.5 feet

*Water table kind:* Apparent

*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* Low

*Runoff class:* Very low

*Parent material:* Loamy alluvial sediments

### ***Use and Management Considerations***

#### **Pasture**

- This map unit is well suited to pasture.

#### **Woodland**

*Suitability:* Well suited to loblolly pine and southern red oak; moderately suited to yellow-poplar and sweetgum

- Wetness may limit the use of log trucks.
- The low strength of the soil interferes with the construction of haul roads and log landings.

#### **Building sites**

- The seasonal high water table may restrict the period when excavations can be made.
- The high content of sand or gravel in the soil increases sloughing and causes cutbanks to be more susceptible to caving.

#### **Septic tank absorption fields**

- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.
- Seepage limits the proper treatment of the effluent from conventional septic systems and may pollute the water table.

#### **Local roads and streets**

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.

### ***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Dragston—4w; Urban land—8s



*Virginia soil management group:* Dragston—E; Urban land—none assigned  
*Hydric soils:* No

## **11—Duckston fine sand, 0 to 2 percent slopes, frequently flooded**

### ***Setting***

*Major land resource area:* Tidewater Area (MLRA 153B)  
*Landform:* Broad flats  
*Position on the landform:* Nearly level, medium to broad flats  
*Shape and size of areas:* Irregular; 5 to 10 acres

### ***Map Unit Composition***

Duckston and similar soils: Typically 85 percent, ranging from about 75 to 95 percent

### ***Typical Profile***

*Surface layer:*  
0 to 4 inches—dark grayish brown fine sand

*Substratum:*  
4 to 15 inches—grayish brown sand  
15 to 60 inches—gray sand

### ***Minor Components***

*Dissimilar:*

- The very poorly drained Bohicket soils; in marshes
- Beaches

*Similar:*

- The poorly drained Nimmo soils; in slight depressions

### ***Soil Properties and Qualities***

*Available water capacity:* Very low (about 2.4 inches)  
*Slowest saturated hydraulic conductivity:* Very high (about 19.98 in/hr)  
*Drainage class:* Poorly drained  
*Depth to seasonal water saturation:* About 0 to 0.5 foot  
*Water table kind:* Apparent  
*Flooding hazard:* Frequent  
*Ponding hazard:* None  
*Shrink-swell potential:* Low  
*Runoff class:* Very high  
*Parent material:* Sandy fluviomarine deposits

### ***Use and Management Considerations***

#### **Pasture**

- This soil is unsuited to pasture.

#### **Woodland**

*Suitability:* Moderately suited to sweetgum

- Flooding may result in damage to haul roads.
- Flooding restricts the safe use of roads by log trucks.
- Wetness may limit the use of log trucks.
- Coarse textured layers may slough, which reduces the efficiency of mechanical planting equipment.



- The coarseness of the soil may reduce the traction of wheeled harvest equipment and log trucks.
- Coarse textured layers in the soil increase the need for maintenance of haul roads and log landings.

**Building sites**

- Flooding is a limitation affecting building site development.

**Septic tank absorption fields**

- Flooding is a limitation affecting septic tank absorption fields.
- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.

**Local roads and streets**

- Flooding may damage local roads and streets.
- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.

***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* 7w

*Virginia soil management group:* QQ

*Hydric soil:* Yes

**12—Johnston silt loam, 0 to 2 percent slopes, frequently flooded**

***Setting***

*Major land resource area:* Atlantic Coast Flatwoods (MLRA 153A)

*Landform:* Flood plains of the Coastal Plain

*Position on the landform:* Nearly level, low-lying flood plains along streams

*Shape and size of areas:* Irregular; 5 to 25 acres

***Map Unit Composition***

Johnston and similar soils: Typically 85 percent, ranging from about 75 to 95 percent

***Typical Profile***

*Surface layer:*

0 to 24 inches—black silt loam

*Substratum:*

24 to 30 inches—dark gray sandy loam

30 to 64 inches—dark grayish brown loamy sand

***Minor Components***

*Dissimilar:*

- The very poorly drained Axis and Bohicket soils; on the lower part of flood plains
- The poorly drained Nimmo and Tomotley soils; in landscape positions similar to those of the Johnston soil

*Similar:*

- Soils that have a clay subsoil
- Soils that are flooded for very long periods
- Soils that are somewhat poorly drained; near the base of side slopes
- Soils that have strata of weathered, calcareous shells



### ***Soil Properties and Qualities***

*Available water capacity:* Moderate (about 8.5 inches)  
*Slowest saturated hydraulic conductivity:* High (about 1.98 in/hr)  
*Drainage class:* Very poorly drained  
*Depth to seasonal water saturation:* At the surface  
*Water table kind:* Apparent  
*Flooding hazard:* Frequent  
*Ponding hazard:* Frequent  
*Depth of ponding:* 0.0 to 1.0 foot  
*Shrink-swell potential:* Low  
*Runoff class:* Negligible  
*Parent material:* Loamy and sandy alluvium

### ***Use and Management Considerations***

#### **Pasture**

- This soil is unsuited to pasture.

#### **Woodland**

- Suitability:* Moderately suited to sweetgum
- Flooding may result in damage to haul roads.
  - Flooding and ponding restrict the safe use of roads by log trucks.
  - Wetness may limit the use of log trucks.
  - The low strength of the soil interferes with the construction of haul roads and log landings.
  - The low strength of the soil may create unsafe conditions for log trucks.

#### **Building sites**

- Flooding and ponding are limitations affecting building site development.

#### **Septic tank absorption fields**

- Flooding and ponding are limitations affecting septic tank absorption fields.
- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.

#### **Local roads and streets**

- Flooding may damage local roads and streets.
- Ponding affects the ease of excavation and grading and limits the bearing capacity of the soil.
- Frost action may damage local roads and streets.

### ***Interpretive Groups***

*Prime farmland:* Not prime farmland  
*Land capability class:* 7w  
*Virginia soil management group:* PP  
*Hydric soil:* Yes

## **13—Lawnes loam, 0 to 1 percent slopes, very frequently flooded**

### ***Setting***

*Major land resource area:* Tidewater Area (MLRA 153B)  
*Landform:* Tidal marshes  
*Position on the landform:* Nearly level freshwater and brackish water tidal marshes  
*Shape and size of areas:* Irregular; 5 to 100 acres



### **Map Unit Composition**

Lawnes and similar soils: Typically 80 percent, ranging from about 70 to 90 percent

### **Typical Profile**

#### *Surface layer:*

0 to 13 inches—dark gray loam

#### *Substratum:*

13 to 26 inches—dark gray loam

26 to 55 inches—very dark gray loam

55 to 62 inches—very dark gray sand

### **Minor Components**

#### *Dissimilar:*

- The well drained Bojac soils; on old point bars
- The moderately well drained Munden and Seabrook soils; on small knolls and rises
- The somewhat poorly drained Dragston soils; in the slightly higher areas

#### *Similar:*

- The somewhat poorly drained Augusta soils; in the slightly higher areas
- The poorly drained Nimmo soils; in landscape positions similar to those of the Lawnes soil
- Soils that are ponded after heavy rains in winter and spring and during prolonged wet periods
- Soils that have fossiliferous shells or cobbles within a depth of 50 inches
- Soils in the slightly higher areas that are less frequently flooded

### **Soil Properties and Qualities**

*Available water capacity:* High (about 9.3 inches)

*Slowest saturated hydraulic conductivity:* Moderately high (about 0.57 in/hr)

*Drainage class:* Very poorly drained

*Depth to seasonal water saturation:* At the surface

*Water table kind:* Apparent

*Flooding hazard:* Very frequent

*Ponding hazard:* Frequent

*Depth of ponding:* 0.0 to 3.0 feet

*Shrink-swell potential:* Low

*Runoff class:* Negligible

*Parent material:* Herbaceous organic materials over loamy alluvial sediments

### **Use and Management Considerations**

#### **Pasture**

- This soil is unsuited to pasture.

#### **Woodland**

*Suitability:* Unsuited to woodland

- Flooding may result in damage to haul roads.
- Flooding and ponding restrict the safe use of roads by log trucks.
- Wetness may limit the use of log trucks.
- The low strength of the soil interferes with the construction of haul roads and log landings.
- The low strength of the soil may create unsafe conditions for log trucks.

#### **Building sites**

- Flooding and ponding are limitations affecting building site development.



**Septic tank absorption fields**

- Flooding and ponding are limitations affecting septic tank absorption fields.
- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.

**Local roads and streets**

- Flooding may damage local roads and streets.
- Ponding affects the ease of excavation and grading and limits the bearing capacity of the soil.

***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* 7w

*Virginia soil management group:* PP

*Hydric soil:* Yes

**14—Levy silty clay, 0 to 2 percent slopes, very frequently flooded**

***Setting***

*Major land resource area:* Tidewater Area (MLRA 153B)

*Landform:* Flood plains of the Coastal Plain

*Position on the landform:* Nearly level freshwater and slightly brackish water tidal marshes

*Shape and size of areas:* Irregular; 5 to 100 acres

***Map Unit Composition***

Levy and similar soils: Typically 80 percent, ranging from about 70 to 90 percent

***Typical Profile***

*Surface layer:*

0 to 20 inches—dark olive gray mucky silty clay

*Substratum:*

20 to 40 inches—dark gray mucky silty clay

40 to 60 inches—very dark gray mucky clay

60 to 80 inches—black and gray stratified mucky sandy loam to sandy loam

***Minor Components***

*Dissimilar:*

- The well drained Bojac soils; on old point bars
- The moderately well drained Munden and Seabrook soils; on small knolls and rises
- The somewhat poorly drained Dragston soils; in the slightly higher areas

*Similar:*

- The somewhat poorly drained Augusta soils; in the slightly higher areas
- The poorly drained Nimmo soils; in landscape positions similar to those of the Levy soil
- Soils that are ponded after heavy rains in winter and spring and during prolonged wet periods
- Soils that have fossiliferous shells or cobbles within a depth of 50 inches
- Soils in the slightly higher areas that are less frequently flooded



### ***Soil Properties and Qualities***

*Available water capacity:* High (about 11.4 inches)  
*Slowest saturated hydraulic conductivity:* Moderately low (about 0.03 in/hr)  
*Drainage class:* Very poorly drained  
*Depth to seasonal water saturation:* At the surface  
*Water table kind:* Apparent  
*Flooding hazard:* Very frequent  
*Ponding hazard:* Frequent  
*Depth of ponding:* 0.0 to 3.0 feet  
*Shrink-swell potential:* High  
*Runoff class:* Medium  
*Parent material:* Clayey estuarine sediments

### ***Use and Management Considerations***

#### **Pasture**

- This soil is unsuited to pasture.

#### **Woodland**

- Suitability:* Moderately suited to cypress
- Flooding may result in damage to haul roads.
  - Flooding and ponding restrict the safe use of roads by log trucks.
  - Wetness may limit the use of log trucks.
  - The low strength of the soil interferes with the construction of haul roads and log landings.
  - The low strength of the soil may create unsafe conditions for log trucks.
  - The stickiness of the soil increases the difficulty of constructing haul roads and log landings when the soil is wet.
  - The stickiness of the soil reduces the efficiency of mechanical planting equipment.
  - The stickiness of the soil restricts the use of equipment for site preparation to the drier periods.

#### **Building sites**

- Flooding and ponding are limitations affecting building site development.

#### **Septic tank absorption fields**

- Flooding and ponding are limitations affecting septic tank absorption fields.
- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.

#### **Local roads and streets**

- Flooding may damage local roads and streets.
- Ponding affects the ease of excavation and grading and limits the bearing capacity of the soil.
- Shrinking and swelling restrict the use of the soil as base material for local roads and streets.
- The low strength of the soil is unfavorable for supporting heavy loads.

### ***Interpretive Groups***

*Prime farmland:* Not prime farmland  
*Land capability class:* 7w  
*Virginia soil management group:* PP  
*Hydric soil:* Yes



## **15—Munden-Urban land complex, 0 to 3 percent slopes**

### ***Setting***

*Major land resource area:* Tidewater Area (MLRA 153B)

*Landform:* Marine terraces

*Position on the landform:* Nearly level, medium to broad rises

*Shape and size of areas:* Irregular; 5 to 40 acres

### ***Map Unit Composition***

Munden and similar soils: Typically 70 percent, ranging from about 50 to 90 percent

Urban land and similar areas: Typically 20 percent, ranging from about 10 to 95 percent

### ***Typical Profile***

#### **Munden**

##### *Surface layer:*

0 to 6 inches—very dark grayish brown loamy fine sand

##### *Subsurface layer:*

6 to 14 inches—grayish brown fine sandy loam

##### *Subsoil:*

14 to 27 inches—light yellowish brown fine sandy loam

27 to 38 inches—light olive brown fine sandy loam; light gray iron depletions

##### *Substratum:*

38 to 50 inches—light yellowish brown loamy sand

50 to 61 inches—light gray sand

61 to 70 inches—light gray sand; yellowish brown and light yellowish brown masses of oxidized iron

70 to 74 inches—light gray loamy sand; light yellowish brown masses of oxidized iron

#### **Urban land**

Urban land consists of areas covered by impervious material, such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers. No interpretations are given for Urban land.

### ***Minor Components***

##### *Dissimilar:*

- The somewhat poorly drained Dragston soils; in the lower areas and in slight depressions

##### *Similar:*

- The well drained Bojac soils; in the slightly higher areas

### ***Properties and Qualities of the Munden Soil***

*Available water capacity:* Low (about 5.9 inches)

*Slowest saturated hydraulic conductivity:* Moderately high (about 0.57 in/hr)

*Drainage class:* Moderately well drained

*Depth to seasonal water saturation:* About 1.5 to 2.5 feet

*Water table kind:* Apparent

*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* Low

*Runoff class:* Very low

*Parent material:* Loamy and sandy alluvial sediments



### ***Use and Management Considerations***

#### **Pasture**

- This map unit is well suited to pasture.

#### **Woodland**

*Suitability:* Well suited to loblolly pine; moderately suited to southern red oak and sweetgum

- Coarse textured layers may slough, which reduces the efficiency of mechanical planting equipment.
- The coarseness of the soil may reduce the traction of wheeled harvest equipment and log trucks.
- Coarse textured layers in the soil increase the need for maintenance of haul roads and log landings.

#### **Building sites**

- The seasonal high water table may restrict the period when excavations can be made.
- The high content of sand or gravel in the soil increases sloughing and causes cutbanks to be more susceptible to caving.

#### **Septic tank absorption fields**

- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.
- Seepage limits the proper treatment of the effluent from conventional septic systems and may pollute the water table.

#### **Local roads and streets**

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.

### ***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Munden—2w; Urban land—8s

*Virginia soil management group:* Munden—F; Urban land—none assigned

*Hydric soils:* No

## **16C—Nevarc-Uchee complex, 6 to 15 percent slopes**

### ***Setting***

*Major land resource area:* Atlantic Coast Flatwoods (MLRA 153A)

*Landform:* Uplands

*Position on the landform:* Sloping narrow rises and side slopes

*Shape and size of areas:* Irregular; 5 to 10 acres

### ***Map Unit Composition***

Nevarc and similar soils: Typically 45 percent, ranging from about 40 to 50 percent

Uchee and similar soils: Typically 40 percent, ranging from about 35 to 45 percent

### ***Typical Profile***

#### **Nevarc**

*Surface layer:*

0 to 5 inches—dark grayish brown sandy loam

*Subsurface layer:*

5 to 11 inches—pale brown loam



## Soil Survey of Tidewater Cities Area, Virginia

### *Subsoil:*

11 to 26 inches—yellowish brown clay

26 to 42 inches—yellowish brown clay; grayish brown iron depletions and yellowish red and strong brown masses of oxidized iron

42 to 54 inches—yellowish brown sandy clay loam; grayish brown iron depletions and yellowish red and strong brown masses of oxidized iron

### *Substratum:*

54 to 72 inches—yellowish brown fine sandy loam

### **Uchee**

#### *Surface layer:*

0 to 4 inches—dark gray loamy sand

#### *Subsurface layer:*

4 to 26 inches—light yellowish brown loamy sand

### *Subsoil:*

26 to 30 inches—light yellowish brown and brownish yellow sandy loam

30 to 50 inches—brownish yellow sandy clay loam

### *Substratum:*

50 to 62 inches—yellowish brown sandy clay loam; gray iron depletions and yellowish red and strong brown masses of oxidized iron

### **Minor Components**

#### *Dissimilar:*

- Areas of ferricrete outcrops
- Soils that are severely eroded; on the points of rises and the upper part of side slopes
- Areas that have seeps; at the bases of escarpments

#### *Similar:*

- The moderately well drained Slagle soils; in landscape positions similar to those of the Nevarc and Uchee soils

### **Soil Properties and Qualities**

*Available water capacity:* Nevarc—moderate (about 7.6 inches); Uchee—moderate (about 6.5 inches)

*Slowest saturated hydraulic conductivity:* Nevarc—moderately low (about 0.06 in/hr); Uchee—moderately high (about 0.20 in/hr)

*Drainage class:* Nevarc—moderately well drained; Uchee—well drained

*Depth to seasonal water saturation:* Nevarc—about 1.5 to 3.0 feet; Uchee—not applicable

*Water table kind:* Perched

*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* Moderate

*Runoff class:* Medium

*Parent material:* Nevarc—clayey marine sediments; Uchee—loamy and sandy marine sediments

### **Use and Management Considerations**

#### **Pasture**

*Suitability:* Moderately suited to pasture

- The slope increases surface runoff, nutrient loss, and the hazard of erosion.



### **Woodland**

*Suitability:* Moderately suited to loblolly pine, southern red oak, yellow-poplar, and sweetgum

- The slope creates unsafe operating conditions and reduces the operating efficiency of log trucks.
- The slope may restrict the use of some mechanical planting equipment.
- Coarse textured layers may slough, which reduces the efficiency of mechanical planting equipment.
- The coarseness of the soil may reduce the traction of wheeled harvest equipment and log trucks.
- The stickiness of the soil increases the difficulty of constructing haul roads and log landings when the soil is wet.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- The stickiness of the soil restricts the use of equipment for site preparation to the drier periods.

### **Building sites**

- The seasonal high water table may restrict the period when excavations can be made.
- The slope influences the use of machinery and the amount of excavation required.
- The high content of sand or gravel in the soil increases sloughing and causes cutbanks to be more susceptible to caving.
- The high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

### **Septic tank absorption fields**

- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.
- The restricted permeability of these soils limits the absorption and proper treatment of the effluent from conventional septic systems.
- The slope limits the proper treatment of effluent from conventional septic systems.

### **Local roads and streets**

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- Shrinking and swelling restrict the use of the soil as base material for local roads and streets.
- The low strength of the soil is unfavorable for supporting heavy loads.
- The slope makes designing local roads and streets difficult.

### ***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Nevarc—4e; Uchee—4s

*Virginia soil management group:* Nevarc—HH; Uchee—DD

*Hydric soils:* No

## **16D—Nevarc-Uchee complex, 15 to 50 percent slopes**

### ***Setting***

*Major land resource area:* Atlantic Coast Flatwoods (MLRA 153A)

*Landform:* Uplands

*Position on the landform:* Moderately steep to very steep, narrow to medium side slopes

*Shape and size of areas:* Irregular and elongated; 5 to 100 acres



### **Map Unit Composition**

Nevarc and similar soils: Typically 45 percent, ranging from about 40 to 50 percent

Uchee and similar soils: Typically 40 percent, ranging from about 35 to 45 percent

### **Typical Profile**

#### **Nevarc**

##### *Surface layer:*

0 to 5 inches—dark grayish brown sandy loam

##### *Subsurface layer:*

5 to 11 inches—pale brown loam

##### *Subsoil:*

11 to 26 inches—yellowish brown clay

26 to 42 inches—yellowish brown clay; grayish brown iron depletions and yellowish red and strong brown masses of oxidized iron

42 to 54 inches—yellowish brown sandy clay loam; grayish brown iron depletions and yellowish red and strong brown masses of oxidized iron

##### *Substratum:*

54 to 72 inches—yellowish brown fine sandy loam

#### **Uchee**

##### *Surface layer:*

0 to 4 inches—dark gray loamy sand

##### *Subsurface layer:*

4 to 26 inches—light yellowish brown loamy sand

##### *Subsoil:*

26 to 30 inches—light yellowish brown and brownish yellow sandy loam

30 to 50 inches—brownish yellow sandy clay loam

##### *Substratum:*

50 to 62 inches—yellowish brown sandy clay loam; gray iron depletions and yellowish red and strong brown masses of oxidized iron

### **Minor Components**

#### *Dissimilar:*

- Areas of ferricrete outcrops
- Soils that are severely eroded; on the points of rises and the upper part of side slopes
- Areas that have seeps; at the bases of escarpments

#### *Similar:*

- The moderately well drained Slagle soils; in landscape positions similar to those of the Nevarc and Uchee soils

### **Soil Properties and Qualities**

*Available water capacity:* Nevarc—moderate (about 7.6 inches); Uchee—moderate (about 6.5 inches)

*Slowest saturated hydraulic conductivity:* Nevarc—moderately low (about 0.06 in/hr); Uchee—moderately high (about 0.20 in/hr)

*Drainage class:* Nevarc—moderately well drained; Uchee—well drained

*Depth to seasonal water saturation:* Nevarc—about 1.5 to 3.0 feet; Uchee—not applicable

*Water table kind:* Perched



*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* Moderate

*Runoff class:* Medium

*Parent material:* Nevarc—clayey marine sediments; Uchee—loamy and sandy marine sediments

### ***Use and Management Considerations***

#### **Pasture**

- These soils are unsuited to pasture.

#### **Woodland**

*Suitability:* Moderately suited to loblolly pine, southern red oak, yellow-poplar, and sweetgum

- The slope poses safety hazards and creates a potential for erosion during construction of haul roads and log landings.
- The slope creates unsafe operating conditions and reduces the operating efficiency of log trucks and harvesting and mechanical planting equipment.
- The slope restricts the use of equipment for preparing sites for planting and seeding.
- The slope makes the use of mechanical planting equipment impractical.
- Coarse textured layers may slough, which reduces the efficiency of mechanical planting equipment.
- The coarseness of the soil may reduce the traction of wheeled harvest equipment and log trucks.
- The low strength of the soil interferes with the construction of haul roads and log landings.
- The stickiness of the soil increases the difficulty of constructing haul roads and log landings when the soil is wet.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- The stickiness of the soil restricts the use of equipment for site preparation to the drier periods.

#### **Building sites**

- The seasonal high water table may restrict the period when excavations can be made.
- The slope influences the use of machinery and the amount of excavation required.
- The high content of sand or gravel in the soil increases sloughing and causes cutbanks to be more susceptible to caving.
- The high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

#### **Septic tank absorption fields**

- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.
- The restricted permeability of these soils limits the absorption and proper treatment of the effluent from conventional septic systems.
- The slope limits the proper treatment of effluent from conventional septic systems.

#### **Local roads and streets**

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- Shrinking and swelling restrict the use of the soil as base material for local roads and streets.
- The low strength of the soil is unfavorable for supporting heavy loads.
- The slope makes designing local roads and streets difficult.



### ***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Nevarc—7e; Uchee—6e

*Virginia soil management group:* Nevarc—HH; Uchee—DD

*Hydric soils:* No

## **17—Newflat-Urban land complex, 0 to 2 percent slopes**

### ***Setting***

*Major land resource area:* Atlantic Coast Flatwoods (MLRA 153A) and Tidewater Area (MLRA 153B)

*Landform:* Stream terraces

*Position on the landform:* Nearly level, medium to broad flats

*Shape and size of areas:* Irregular; 5 to 50 acres

### ***Map Unit Composition***

Newflat and similar soils: Typically 75 percent, ranging from about 60 to 90 percent

Urban land and similar areas: Typically 15 percent, ranging from about 10 to 95 percent

### ***Typical Profile***

#### **Newflat**

*Surface layer:*

0 to 2 inches—gray silt loam

*Subsurface layer:*

2 to 6 inches—pale brown silt loam; gray iron depletions

*Subsoil:*

6 to 14 inches—brown silty clay; grayish brown iron depletions

14 to 55 inches—gray silty clay; strong brown masses of oxidized iron

55 to 64 inches—gray clay loam; strong brown masses of oxidized iron

#### **Urban land**

Urban land consists of areas covered by impervious material, such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers. No interpretations are given for Urban land.

### ***Minor Components***

*Dissimilar:*

- The moderately well drained Altavista soils; in the slightly higher areas

*Similar:*

- The moderately well drained Peawick soils; in the slightly higher areas
- The poorly drained Chickahominy soils; in slight depressions and near drainageways

### ***Properties and Qualities of the Newflat Soil***

*Available water capacity:* Moderate (about 8.9 inches)

*Slowest saturated hydraulic conductivity:* Low (about 0.00 in/hr)

*Drainage class:* Somewhat poorly drained

*Depth to seasonal water saturation:* About 0.5 foot to 1.5 feet

*Water table kind:* Apparent

*Flooding hazard:* None

*Ponding hazard:* None



*Shrink-swell potential:* High

*Runoff class:* Very high

*Parent material:* Clayey alluvial sediments

### ***Use and Management Considerations***

#### **Pasture**

- This map unit is moderately suited to pasture.

#### **Woodland**

*Suitability:* Well suited to loblolly pine; moderately suited to southern red oak and sweetgum

- Wetness may limit the use of log trucks.
- The low strength of the soil interferes with the construction of haul roads and log landings.
- The low strength of the soil may create unsafe conditions for log trucks.
- The stickiness of the soil increases the difficulty of constructing haul roads and log landings when the soil is wet.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- The stickiness of the soil restricts the use of equipment for site preparation to the drier periods.

#### **Building sites**

- The seasonal high water table may restrict the period when excavations can be made.
- Shrinking and swelling of the soil may crack foundations and basement walls.
- The high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

#### **Septic tank absorption fields**

- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.
- The restricted permeability of the soil limits the absorption and proper treatment of the effluent from conventional septic systems.

#### **Local roads and streets**

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- Shrinking and swelling restrict the use of the soil as base material for local roads and streets.
- The low strength of the soil is unfavorable for supporting heavy loads.

### ***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Newflat—4w; Urban land—8s

*Virginia soil management group:* Newflat—LL; Urban land—none assigned

*Hydric soils:* No

## **18—Nimmo-Urban land complex, 0 to 2 percent slopes**

### ***Setting***

*Major land resource area:* Tidewater Area (MLRA 153B)

*Landform:* Marine terraces

*Position on the landform:* Nearly level, medium to broad flats

*Shape and size of areas:* Irregular; 5 to 40 acres



### **Map Unit Composition**

Nimmo and similar soils: Typically 70 percent, ranging from about 60 to 90 percent  
Urban land and similar areas: Typically 20 percent, ranging from about 10 to 95 percent

### **Typical Profile**

#### **Nimmo**

##### *Surface layer:*

0 to 4 inches—black fine sandy loam

##### *Subsurface layer:*

4 to 10 inches—dark gray sandy loam; yellowish brown masses of oxidized iron

10 to 14 inches—dark gray sandy loam

##### *Subsoil:*

14 to 32 inches—gray fine sandy loam

##### *Substratum:*

32 to 40 inches—gray sand; yellowish brown masses of oxidized iron

40 to 64 inches—gray coarse sand

#### **Urban land**

Urban land consists of areas covered by impervious material, such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers. No interpretations are given for Urban land.

### **Minor Components**

##### *Dissimilar:*

- The moderately well drained Munden and Seabrook soils; in the slightly higher areas

##### *Similar:*

- The poorly drained Tomotley soils; in landscape positions similar to those of the Nimmo soil
- Soils that have water on the surface in winter and early spring and during periods of prolonged rainfall

### **Properties and Qualities of the Nimmo Soil**

*Available water capacity:* Low (about 5.7 inches)

*Slowest saturated hydraulic conductivity:* Moderately high (about 0.57 in/hr)

*Drainage class:* Poorly drained

*Depth to seasonal water saturation:* About 0 to 1.0 foot

*Water table kind:* Apparent

*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* Low

*Runoff class:* Very high

*Parent material:* Loamy and sandy alluvial sediments

### **Use and Management Considerations**

#### **Pasture**

- This map unit is poorly suited to pasture.

#### **Woodland**

*Suitability:* Well suited to loblolly pine and moderately suited to sweetgum

- Wetness may limit the use of log trucks.
- This map unit is well suited to haul roads and log landings.



**Building sites**

- The seasonal high water table may restrict the period when excavations can be made.
- The high content of sand or gravel in the soil increases sloughing and causes cutbanks to be more susceptible to caving.

**Septic tank absorption fields**

- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.

**Local roads and streets**

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.

***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Nimmo—4w; Urban land—8s

*Virginia soil management group:* Nimmo—E; Urban land—none assigned

*Hydric soils:* Nimmo—yes; Urban land—no

**19—Peawick-Urban land complex, 0 to 3 percent slopes**

***Setting***

*Major land resource area:* Atlantic Coast Flatwoods (MLRA 153A)

*Landform:* Stream terraces

*Position on the landform:* Nearly level, medium to broad flats

*Shape and size of areas:* Irregular; 5 to 40 acres

***Map Unit Composition***

Peawick and similar soils: Typically 70 percent, ranging from about 60 to 90 percent

Urban land and similar areas: Typically 20 percent, ranging from about 10 to 95 percent

***Typical Profile***

**Peawick**

*Surface layer:*

0 to 2 inches—very dark grayish brown silt loam

*Subsurface layer:*

2 to 5 inches—light yellowish brown silt loam

*Subsoil:*

5 to 24 inches—yellowish brown silty clay loam; strong brown masses of oxidized iron

24 to 36 inches—yellowish brown silty clay; gray iron depletions and strong brown masses of oxidized iron

36 to 64 inches—gray clay; yellowish brown masses of oxidized iron

**Urban land**

Urban land consists of areas covered by impervious material, such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers. No interpretations are given for Urban land.

***Minor Components***

*Dissimilar:*

- The poorly drained Chickahominy soils; in the lower areas, in slight depressions, and near drainageways



*Similar:*

- The somewhat poorly drained Newflat soils; in the lower areas, in slight depressions, and near drainageways

***Properties and Qualities of the Peawick Soil***

*Available water capacity:* Moderate (about 8.4 inches)

*Slowest saturated hydraulic conductivity:* Low (about 0.00 in/hr)

*Drainage class:* Moderately well drained

*Depth to seasonal water saturation:* About 1.5 to 3.0 feet

*Water table kind:* Perched

*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* High

*Runoff class:* Medium

*Parent material:* Clayey alluvial sediments

***Use and Management Considerations***

**Pasture**

*Suitability:* Well suited to pasture

**Woodland**

*Suitability:* Moderately suited to loblolly pine and southern red oak

- The low strength of the soil interferes with the construction of haul roads and log landings.
- The low strength of the soil may create unsafe conditions for log trucks.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- The stickiness of the soil restricts the use of equipment for site preparation to the drier periods.

**Building sites**

- The seasonal high water table may restrict the period when excavations can be made.
- Shrinking and swelling of the soil may crack foundations and basement walls.
- The high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

**Septic tank absorption fields**

- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.
- The restricted permeability of the soil limits the absorption and proper treatment of the effluent from conventional septic systems.

**Local roads and streets**

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- Shrinking and swelling restrict the use of the soil as base material for local roads and streets.
- The low strength of the soil is unfavorable for supporting heavy loads.

***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Peawick—2w; Urban land—8s

*Virginia soil management group:* Peawick—HH; Urban land—none assigned

*Hydric soils:* No



## **20—Seabrook-Urban land complex, 0 to 2 percent slopes**

### ***Setting***

*Major land resource area:* Tidewater Area (MLRA 153B)

*Landform:* Marine terraces

*Position on the landform:* Nearly level, medium to broad rises

*Shape and size of areas:* Irregular; 5 to 40 acres

### ***Map Unit Composition***

Seabrook and similar soils: Typically 70 percent, ranging from about 60 to 90 percent

Urban land and similar areas: Typically 20 percent, ranging from about 10 to 95 percent

### ***Typical Profile***

#### **Seabrook**

*Surface layer:*

0 to 9 inches—dark grayish brown loamy fine sand

*Substratum:*

9 to 20 inches—light yellowish brown loamy sand

20 to 26 inches—yellowish brown loamy sand

26 to 40 inches—yellowish brown loamy sand; light gray iron depletions and strong brown masses of oxidized iron

40 to 53 inches—yellowish brown loamy sand; light gray iron depletions

53 to 60 inches—light gray loamy sand; yellowish brown masses of oxidized iron

60 to 80 inches—strong brown gravelly sand; reddish brown masses of oxidized iron

#### **Urban land**

Urban land consists of areas covered by impervious material, such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers. No interpretations are given for Urban land.

### ***Minor Components***

*Dissimilar:*

- The poorly drained Tomotley soils; in landscape positions similar to those of the Seabrook soil
- Soils that have water on the surface in winter and early spring and during periods of prolonged rainfall

*Similar:*

- The moderately well drained Munden soils; in the slightly higher areas

### ***Properties and Qualities of the Seabrook Soil***

*Available water capacity:* Low (about 3.8 inches)

*Slowest saturated hydraulic conductivity:* High (about 5.95 in/hr)

*Drainage class:* Moderately well drained

*Depth to seasonal water saturation:* About 2.0 to 3.5 feet

*Water table kind:* Apparent

*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* Low

*Runoff class:* Very low

*Parent material:* Sandy fluviomarine sediments



### ***Use and Management Considerations***

#### **Pasture**

- This map unit is moderately suited to pasture.

#### **Woodland**

*Suitability:* Moderately suited to loblolly pine and southern red oak

- Coarse textured layers may slough, which reduces the efficiency of mechanical planting equipment.
- The coarseness of the soil may reduce the traction of wheeled harvest equipment and log trucks.
- Coarse textured layers in the soil increase the need for maintenance of haul roads and log landings.

#### **Building sites**

- The seasonal high water table may restrict the period when excavations can be made.
- The high content of sand or gravel in the soil increases sloughing and causes cutbanks to be more susceptible to caving.

#### **Septic tank absorption fields**

- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.
- Seepage limits the proper treatment of the effluent from conventional septic systems and may pollute the water table.

#### **Local roads and streets**

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.

### ***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Seabrook—3s; Urban land—8s

*Virginia soil management group:* Seabrook—EE; Urban land—none assigned

*Hydric soils:* No

## **21A—Slagle-Urban land complex, 0 to 2 percent slopes**

### ***Setting***

*Major land resource area:* Atlantic Coast Flatwoods (MLRA 153A)

*Landform:* Uplands

*Position on the landform:* Nearly level to gently sloping, medium to broad rises

*Shape and size of areas:* Irregular; 5 to 40 acres

*Note:* Some small areas of this map unit are undeveloped

### ***Map Unit Composition***

Slagle and similar soils: Typically 70 percent, ranging from about 40 to 95 percent

Urban land and similar areas: Typically 20 percent, ranging from about 10 to 95 percent

### ***Typical Profile***

#### **Slagle**

*Surface layer:*

0 to 10 inches—dark grayish brown fine sandy loam



*Subsoil:*

10 to 25 inches—yellowish brown sandy clay loam; strong brown and pale brown masses of oxidized iron

25 to 44 inches—yellowish brown sandy clay loam; grayish brown iron depletions and strong brown masses of oxidized iron

44 to 63 inches—yellowish brown sandy clay loam; light brownish gray and gray iron depletions and yellowish red masses of oxidized iron

**Urban land**

Urban land consists of areas covered by impervious material, such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers. No interpretations are given for Urban land.

***Minor Components***

*Dissimilar:*

- The well drained Uchee soils; in the slightly higher areas
- The poorly drained Bethera soils; in slight depressions and around drainageways

*Similar:*

- The moderately well drained Peawick soils; in landscape positions similar to those of the Slagle soil
- Soils that have water on the surface for brief periods after heavy or prolonged rainfall in winter and spring
- Soils that have a surface layer that is thicker than that of the Slagle soil

***Properties and Qualities of the Slagle Soil***

*Available water capacity:* Moderate (about 8.7 inches)

*Slowest saturated hydraulic conductivity:* Moderately low (about 0.06 in/hr)

*Drainage class:* Moderately well drained

*Depth to seasonal water saturation:* About 1.5 to 3.0 feet

*Water table kind:* Apparent

*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* Moderate

*Runoff class:* Low

*Parent material:* Loamy marine sediments

***Use and Management Considerations***

**Pasture**

- This map unit is well suited to pasture.

**Woodland**

*Suitability:* Well suited to loblolly pine; moderately suited to southern red oak, yellow-poplar, and sweetgum

- The low strength of the soil interferes with the construction of haul roads and log landings.
- The low strength of the soil may create unsafe conditions for log trucks.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.

**Building sites**

- The seasonal high water table may restrict the period when excavations can be made.

**Septic tank absorption fields**

- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.



- The restricted permeability of the soil limits the absorption and proper treatment of the effluent from conventional septic systems.

**Local roads and streets**

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- Shrinking and swelling restrict the use of the soil as base material for local roads and streets.
- The low strength of the soil is unfavorable for supporting heavy loads.

***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Slagle—2e; Urban land—8s

*Virginia soil management group:* Slagle—K; Urban land—none assigned

*Hydric soils:* No

**21B—Slagle-Urban land complex, 2 to 6 percent slopes**

***Setting***

*Major land resource area:* Atlantic Coast Flatwoods (MLRA 153A)

*Landform:* Uplands

*Position on the landform:* Nearly level to gently sloping, medium to broad rises

*Shape and size of areas:* Irregular; 5 to 40 acres

*Note:* Some small areas of this map unit are undeveloped

***Map Unit Composition***

Slagle and similar soils: Typically 70 percent, ranging from about 40 to 95 percent

Urban land and similar areas: Typically 20 percent, ranging from about 10 to 95 percent

***Typical Profile***

**Slagle**

*Surface layer:*

0 to 10 inches—dark grayish brown fine sandy loam

*Subsoil:*

10 to 25 inches—yellowish brown sandy clay loam; strong brown and pale brown masses of oxidized iron

25 to 44 inches—yellowish brown sandy clay loam; grayish brown iron depletions and strong brown masses of oxidized iron

44 to 63 inches—yellowish brown sandy clay loam; light brownish gray and gray iron depletions and yellowish red masses of oxidized iron

**Urban land**

Urban land consists of areas covered by impervious material, such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers. No interpretations are given for Urban land.

***Minor Components***

*Dissimilar:*

- The well drained Uchee soils; in the slightly higher areas
- The poorly drained Bethera soils; in slight depressions and around drainageways



*Similar:*

- The moderately well drained Peawick soils; in landscape positions similar to those of the Slagle soil
- Soils that have water on the surface for brief periods after heavy or prolonged rainfall in winter and spring
- Soils that have a surface layer that is thicker than that of the Slagle soil

***Properties and Qualities of the Slagle Soil***

*Available water capacity:* Moderate (about 8.7 inches)

*Slowest saturated hydraulic conductivity:* Moderately low (about 0.06 in/hr)

*Drainage class:* Moderately well drained

*Depth to seasonal water saturation:* About 1.5 to 3.0 feet

*Water table kind:* Apparent

*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* Moderate

*Runoff class:* Low

*Parent material:* Loamy marine sediments

***Use and Management Considerations***

**Pasture**

- This map unit is well suited to pasture.

**Woodland**

*Suitability:* Well suited to loblolly pine; moderately suited to southern red oak, yellow-poplar, and sweetgum

- The low strength of the soil interferes with the construction of haul roads and log landings.
- The low strength of the soil may create unsafe conditions for log trucks.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.

**Building sites**

- The seasonal high water table may restrict the period when excavations can be made.

**Septic tank absorption fields**

- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.
- The restricted permeability of the soil limits the absorption and proper treatment of the effluent from conventional septic systems.

**Local roads and streets**

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- Shrinking and swelling restrict the use of the soil as base material for local roads and streets.
- The low strength of the soil is unfavorable for supporting heavy loads.

***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Slagle—2e; Urban land—8s

*Virginia soil management group:* Slagle—K; Urban land—none assigned

*Hydric soils:* No



## **22—State-Urban land complex, 0 to 3 percent slopes**

### ***Setting***

*Major land resource area:* Tidewater Area (MLRA 153B)

*Landform:* Marine terraces

*Position on the landform:* Nearly level, medium to broad rises

*Shape and size of areas:* Irregular; 5 to 120 acres

### ***Map Unit Composition***

State and similar soils: Typically 70 percent, ranging from about 65 to 90 percent

Urban land and similar areas: Typically 20 percent, ranging from about 10 to 95 percent

### ***Typical Profile***

#### **State**

*Surface layer:*

0 to 10 inches—brown fine sandy loam

*Subsoil:*

10 to 14 inches—yellowish brown sandy clay loam

14 to 40 inches—strong brown sandy clay loam

40 to 50 inches—strong brown sandy clay loam; reddish yellow masses of oxidized iron

50 to 56 inches—brownish yellow and yellowish brown sandy clay loam

*Substratum:*

56 to 64 inches—yellowish brown and brownish yellow sandy loam

64 to 84 inches—yellow sand

#### **Urban land**

Urban land consists of areas covered by impervious material, such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers. No interpretations are given for Urban land.

### ***Minor Components***

*Dissimilar:*

- The somewhat poorly drained Augusta soils; in the slightly lower areas and in slight depressions

*Similar:*

- The moderately well drained Altavista soils; in landscape positions similar to those of the State soil

### ***Properties and Qualities of the State Soil***

*Available water capacity:* High (about 9.3 inches)

*Slowest saturated hydraulic conductivity:* Moderately high (about 0.57 in/hr)

*Drainage class:* Well drained

*Depth to seasonal water saturation:* About 4.0 to 6.6 feet

*Water table kind:* Apparent

*Flooding hazard:* Rare

*Ponding hazard:* None

*Shrink-swell potential:* Low

*Runoff class:* Low

*Parent material:* Loamy and sandy alluvium



### ***Use and Management Considerations***

#### **Pasture**

- This map unit is well suited to pasture.

#### **Woodland**

*Suitability:* Well suited to loblolly pine, southern red oak, and yellow-poplar

- This map unit is well suited to haul roads and log landings.
- This map unit is well suited to equipment operations.

#### **Building sites**

- Flooding is a limitation affecting building site development.

#### **Septic tank absorption fields**

- Seepage limits the proper treatment of the effluent from conventional septic systems and may pollute the water table.

#### **Local roads and streets**

- This map unit is well suited to local roads and streets.

### ***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* State—1; Urban land—8s

*Virginia soil management group:* State—B; Urban land—none assigned

*Hydric soils:* No

## **23—Suffolk fine sandy loam, 2 to 6 percent slopes**

### ***Setting***

*Major land resource area:* Atlantic Coast Flatwoods (MLRA 153A)

*Landform:* Marine terraces

*Position on the landform:* Uplands

*Shape and size of areas:* Smooth elongated or irregularly oval; 4 to 30 acres

### ***Map Unit Composition***

Suffolk and similar soils: Typically 40 percent, ranging from about 35 to 45 percent

### ***Typical Profile***

*Surface layer:*

0 to 10 inches—brown fine sandy loam

*Subsoil:*

10 to 14 inches—yellowish brown sandy loam

14 to 38 inches—strong brown sandy loam

38 to 43 inches—strong brown loamy sand

*Substratum:*

43 to 65 inches—yellow sand; reddish yellow masses of oxidized iron

### ***Minor Components***

*Dissimilar:*

- The somewhat poorly drained Augusta soils; in the slightly lower areas and in slight depressions

*Similar:*

- The moderately well drained Altavista soils; in landscape positions similar to those of the Suffolk soil



### ***Soil Properties and Qualities***

*Available water capacity:* Low (about 5.6 inches)

*Slowest saturated hydraulic conductivity:* Moderately high (about 0.57 in/hr)

*Drainage class:* Well drained

*Depth to seasonal water saturation:* More than 6.0 feet

*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* Low

*Runoff class:* Low

*Parent material:* Loamy marine sediments

### ***Use and Management Considerations***

#### **Pasture**

*Suitability:* Well suited to pasture

- The slope increases surface runoff, nutrient loss, and the hazard of erosion.

#### **Woodland**

*Suitability:* Moderately suited to loblolly pine and southern red oak

- This soil is well suited to haul roads and log landings.
- This soil is well suited to equipment operations.

#### **Building sites**

- The high content of sand or gravel in the soil increases sloughing and causes cutbanks to be more susceptible to caving.

#### **Septic tank absorption fields**

- Seepage limits the proper treatment of the effluent from conventional septic systems and may pollute the water table.

#### **Local roads and streets**

- This soil is well suited to local roads and streets.

### ***Interpretive Groups***

*Prime farmland:* Prime farmland in all areas

*Land capability class:* 2e

*Virginia soil management group:* T

*Hydric soil:* No

## **24—Tomotley-Urban land complex, 0 to 2 percent slopes**

### ***Setting***

*Major land resource area:* Tidewater Area (MLRA 153B)

*Landform:* Marine terraces

*Position on the landform:* Nearly level, medium to broad flats

*Shape and size of areas:* Irregular; 5 to 30 acres

*Note:* Some small areas of this map unit are undeveloped

### ***Map Unit Composition***

Tomotley and similar soils: Typically 70 percent, ranging from about 60 to 90 percent

Urban land and similar areas: Typically 15 percent, ranging from about 10 to 95 percent



### ***Typical Profile***

#### **Tomotley**

##### *Surface layer:*

0 to 4 inches—dark gray fine sandy loam

##### *Subsurface layer:*

4 to 8 inches—dark grayish brown fine sandy loam

##### *Subsoil:*

8 to 15 inches—gray fine sandy loam; yellowish brown masses of oxidized iron

15 to 38 inches—dark gray sandy clay loam; yellowish brown masses of oxidized iron

38 to 58 inches—gray sandy clay loam; light olive brown masses of oxidized iron

58 to 65 inches—gray fine sandy loam; light olive brown masses of oxidized iron

##### *Substratum:*

65 to 75 inches—gray loamy sand

#### **Urban land**

Urban land consists of areas covered by impervious material, such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers. No interpretations are given for Urban land.

### ***Minor Components***

##### *Dissimilar:*

- The well drained Bojac soils; on old point bars
- The moderately well drained Munden and Seabrook soils; on small knolls and rises
- The somewhat poorly drained Dragston soils; in the slightly higher areas

##### *Similar:*

- The somewhat poorly drained Augusta soils; in the slightly higher areas
- The poorly drained Nimmo soils; in landscape positions similar to those of the Tomotley soil
- Soils that are ponded after heavy rains in winter and spring and during prolonged wet periods
- Soils that have fossiliferous shells or cobbles within a depth of 50 inches

### ***Properties and Qualities of the Tomotley Soil***

*Available water capacity:* Moderate (about 8.9 inches)

*Slowest saturated hydraulic conductivity:* Moderately high (about 0.20 in/hr)

*Drainage class:* Poorly drained

*Depth to seasonal water saturation:* About 0 to 1.0 foot

*Water table kind:* Apparent

*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* Low

*Runoff class:* Very high

*Parent material:* Loamy alluvial sediments

### ***Use and Management Considerations***

#### **Pasture**

- This map unit is moderately suited to pasture

#### **Woodland**

*Suitability:* Well suited to sweetgum

- Wetness may limit the use of log trucks.
- This map unit is well suited to haul roads and log landings.



**Building sites**

- The seasonal high water table may restrict the period when excavations can be made.

**Septic tank absorption fields**

- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.

**Local roads and streets**

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- The low strength of the soil may cause structural damage to local roads and streets.

***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Tomotley—4w; Urban land—8s

*Virginia soil management group:* Tomotley—OO; Urban land—none assigned

*Hydric soils:* Tomotley—yes; Urban land—no

**25—Uchee loamy fine sand, 2 to 6 percent slopes**

***Setting***

*Major land resource area:* Atlantic Coast Flatwoods (MLRA 153A)

*Landform:* Uplands

*Position on the landform:* Gently sloping, medium to broad rises

*Shape and size of areas:* Irregular; 5 to 40 acres

***Map Unit Composition***

Uchee and similar soils: Typically 80 percent, ranging from about 70 to 90 percent

***Typical Profile***

*Surface layer:*

0 to 4 inches—dark gray loamy sand

*Subsurface layer:*

4 to 26 inches—light yellowish brown loamy sand

*Subsoil:*

26 to 30 inches—light yellowish brown and brownish yellow sandy loam

30 to 50 inches—brownish yellow sandy clay loam

*Substratum:*

50 to 62 inches—yellowish brown sandy clay loam; gray iron depletions and yellowish red and strong brown masses of oxidized iron

***Minor Components***

*Dissimilar:*

- The moderately well drained Slagle soils; in slight depressions and in areas adjacent to drainageways

***Soil Properties and Qualities***

*Available water capacity:* Moderate (about 6.5 inches)

*Slowest saturated hydraulic conductivity:* Moderately high (about 0.20 in/hr)

*Drainage class:* Well drained

*Depth to seasonal water saturation:* About 3.5 to 5.0 feet

*Water table kind:* Perched



*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* Moderate

*Runoff class:* Low

*Parent material:* Loamy and sandy marine sediments

### ***Use and Management Considerations***

#### **Pasture**

*Suitability:* Well suited to pasture

- The slope increases surface runoff, nutrient loss, and the hazard of erosion.

#### **Woodland**

*Suitability:* Well suited to southern red oak; moderately suited to loblolly pine

- Coarse textured layers may slough, which reduces the efficiency of mechanical planting equipment.
- The coarseness of the soil may reduce the traction of wheeled harvest equipment and log trucks.

#### **Building sites**

- The seasonal high water table may restrict the period when excavations can be made.
- The high content of sand or gravel in the soil increases sloughing and causes cutbanks to be more susceptible to caving.

#### **Septic tank absorption fields**

- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.
- Seepage limits the proper treatment of the effluent from conventional septic systems and may pollute the water table.

#### **Local roads and streets**

- This soil is well suited to local roads and streets.

### ***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* 2s

*Virginia soil management group:* DD

*Hydric soil:* No

## **26—Udorthents-Dumps complex**

### ***Setting***

*Major land resource area:* Tidewater Area (MLRA 153B)

*Landform:* Fill in the Coastal Plain

### ***Map Unit Composition***

Udorthents and similar soils: Typically 50 percent, ranging from about 20 to 95 percent

Dumps and similar areas: Typically 25 percent, ranging from about 15 to 95 percent

### ***Typical Profile***

#### **Udorthents**

Udorthents are deep or very deep, well drained or somewhat excessively drained, nearly level to very steep, loamy and clayey soils. These soils are mainly on summits and side slopes in the uplands. They mostly consist of overburden and waste rock that have been stockpiled during quarrying or mining and soil material that has been cut



and filled during road or building construction. These soils occur in or near quarries and mines, along highways, and near large buildings. Slopes range from 0 to 45 percent. Because of the variability of these soils, a typical profile is not given.

#### **Dumps**

Dumps consist of areas that have been cut and filled for the disposal of refuse and waste from residential, commercial, and industrial sites. The soil materials comprising Dumps are variable. A detailed onsite investigation is needed to determine the suitability and limitations of these areas for any proposed use.

#### ***Use and Management Considerations***

Onsite investigation is needed to determine the suitability for specific uses.

#### ***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Udorthents—none assigned; Dumps—8s

*Virginia soil management group:* None assigned

*Hydric soils:* No

## **27—Urban land**

#### ***Setting***

*Major land resource area:* Tidewater Area (MLRA 153B)

*Landform:* Uplands of the Coastal Plain

#### ***Map Unit Composition***

Urban land and similar areas: Typically 85 percent, ranging from about 10 to 95 percent

#### ***Definition***

This map unit consists of areas such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers.

#### ***Use and Management Considerations***

Onsite investigation is needed to determine the suitability for specific uses.

#### ***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* 8s

*Virginia soil management group:* None assigned

*Hydric soils:* No

## **28—Yemassee-Urban land complex, 0 to 2 percent slopes**

#### ***Setting***

*Major land resource area:* Atlantic Coast Flatwoods (MLRA 153A)

*Landform:* Marine terraces and depressions

*Position on the landform:* Head slopes and depressions

*Shape and size of areas:* Irregular; 5 to 468 acres

#### ***Map Unit Composition***

Yemassee and similar soils: Typically 70 percent, ranging from about 65 to 95 percent



Urban land and similar areas: Typically 15 percent, ranging from about 10 to 95 percent

### ***Typical Profile***

#### **Yemassee**

##### *Surface layer:*

0 to 4 inches—grayish brown fine sandy loam

##### *Subsurface layer:*

4 to 15 inches—pale brown fine sandy loam; strong brown and yellowish brown masses of oxidized iron

##### *Subsoil:*

15 to 40 inches—light brownish gray sandy clay loam; strong brown and yellowish brown masses of oxidized iron

40 to 60 inches—gray sandy loam; yellowish brown, red, and strong brown masses of oxidized iron

#### **Urban land**

Urban land consists of areas covered by impervious material, such as roads, commercial buildings, industries, schools, churches, parking lots, streets, and shopping centers. No interpretations are given for Urban land.

### ***Minor Components***

##### *Dissimilar:*

- The well drained Bojac soils; on old point bars
- The moderately well drained Munden and Seabrook soils; on small knolls and rises
- The somewhat poorly drained Dragston soils; in the slightly higher areas

##### *Similar:*

- The somewhat poorly drained Augusta soils; in the slightly higher areas
- The poorly drained Nimmo soils; in landscape positions similar to those of the Yemassee soil
- Soils that are ponded after heavy rains in winter and spring and during prolonged wet periods
- Soils that have fossiliferous shells or cobbles within a depth of 50 inches

### ***Properties and Qualities of the Yemassee Soil***

*Available water capacity:* Moderate (about 8.5 inches)

*Slowest saturated hydraulic conductivity:* Moderately high (about 0.57 in/hr)

*Drainage class:* Somewhat poorly drained

*Depth to seasonal water saturation:* About 1.0 to 1.5 feet

*Water table kind:* Apparent

*Flooding hazard:* None

*Ponding hazard:* None

*Shrink-swell potential:* Low

*Runoff class:* Very high

*Parent material:* Loamy marine deposits

### ***Use and Management Considerations***

#### **Pasture**

- This map unit is poorly suited to pasture.

#### **Woodland**

*Suitability:* Moderately suited to sweetgum

- Wetness may limit the use of log trucks.
- This map unit is well suited to haul roads and log landings.



**Building sites**

- The seasonal high water table may restrict the period when excavations can be made.

**Septic tank absorption fields**

- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from conventional septic systems.

**Local roads and streets**

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- Frost action may damage local roads and streets.

***Interpretive Groups***

*Prime farmland:* Not prime farmland

*Land capability class:* Yemassee—4w; Urban land—8s

*Virginia soil management group:* Yemassee—OO; Urban land—none assigned

*Hydric soils:* No

**DAM—Dam**

***Setting***

*Major land resource area:* Atlantic Coast Flatwoods (MLRA 153A)

*Landform:* Unspecified

***Definition***

This map unit is made up of the Skiffes Creek Reservoir and Indigo Lake Dams. The Skiffes Creek Reservoir Dam is a concrete barrier that obstructs the flow of water from the Blows Mill Run and Skiffes Creek. The Indigo Lake Dam is an earthen barrier that obstructs the flow of water from a small watershed.

**W—Water**

***Definition***

This map unit is in the Coastal Plain physiographic province. It includes ponds, lakes, rivers, and reservoirs.



# Use and Management of the Soils

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This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for pasture; as forestland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; for agricultural waste management; and as wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of gravel, sand, reclamation material, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

## Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various uses. Many of the tables identify the limitations that affect specified uses and indicate the severity of those limitations. The ratings in these tables are both verbal and numerical.

## Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are *not limited*, *somewhat limited*, and *very limited*. The suitability ratings are expressed as *well suited*, *moderately suited*, *poorly suited*, and *unsuited* or as *good*, *fair*, and *poor*.

## Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate



gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

## **Pasture**

General management needed for pasture is suggested in this section. The estimated yields of the main pasture plants are listed, the system of land capability classification used by the Natural Resources Conservation Service is explained, and Virginia soil management groups are described.

Planners of management systems for individual fields should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

## **Yields per Acre**

The average yields that can be expected under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification and the Virginia soil management group of map units in the survey area also are shown in the table.

The yields are based on the Virginia Agronomic Land Use Evaluation System, or VALUES (Virginia Polytechnic Institute and State University, 1994). Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of pasture plants depends on the kind of soil and the plant. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; control of weeds, plant diseases, and harmful insects; and favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements.

Realistic yield goals can be maintained over a long-term basis through proper nutrient management and other soil amendments, such as lime. Applications of nitrogen and phosphorus from organic and inorganic forms should be administered according to approved nutrient management practices and regulations.

Pasture yields are expressed in terms of animal unit months. An animal unit month (AUM) is the amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in the yields table are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

## **Land Capability Classification**

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils



are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.

In the capability system, soils are generally grouped at two levels—capability class and subclass (USDA, 1961).

*Capability classes*, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

*Capability subclasses* are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, 2*e*. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, wildlife habitat, or recreation.

The capability classification of the soils in this survey area is given in the section "Detailed Soil Map Units" and in the yields table.

## Virginia Soil Management Groups

The Virginia Agronomic Land Use Evaluation System (VALUES) is a system that ranks soils for management and productivity (Virginia Polytechnic Institute and State University, 1994). VALUES places each soil series in Virginia into one of 43 management groups. The management groups, A through QQ, include the following soil characteristics: regional occurrence; parent material; landscape position or influence; solum thickness; dominant profile features, such as texture; available water capacity for plants; and internal soil drainage. Economically and environmentally



feasible yields were assigned to each management group based on yields of field trial crop data and research. The following paragraphs describe the soil management groups in the Tidewater Cities Area.

*Group B.* The soils of this group formed in alluvium and are on nearly level or gently sloping flood plains or stream terraces in the Coastal Plain region. These soils are very deep, have a loamy texture throughout, have a high available water capacity, and are well drained or moderately well drained.

*Group E.* The soils of this group formed in sandy coastal plain sediments on low-lying terraces, in depressions, or on flats where surface drainage is restricted. These soils are deep and have a coarse-loamy texture throughout; generally have a high water table, even during some parts of the growing season; have a high available water capacity; and are poorly drained.

*Group F.* The soils of this group formed in coarse textured coastal plain sediments and are in low-lying landscape positions underlain by stratified loamy sediments. These soils are very deep, have a coarse-loamy texture throughout, have a moderate or high available water capacity, and are somewhat poorly drained.

*Group K.* The soils of this group formed in mixed marine and fluvial sediments in the Coastal Plain and are on landscapes that range from stream terraces to broad, nearly level interfluvies on uplands. These soils are very deep, have a loamy surface layer and a clay loam to clayey subsurface layer, have a moderate available water capacity, and are somewhat poorly drained.

*Group T.* The soils of this group formed in loamy sediments of the Coastal Plain and are located on uplands and stream terraces in the Coastal Plain. These soils are deep, have fine-loamy subsurface textures and generally are underlain by coarser sediments, have a moderate available water capacity, and are well drained.

*Group Z.* The soils of this group formed in alluvial or colluvial sediments and are on low terraces. These soils are very deep, have a clayey subsurface layer, have a moderate available water capacity, and are well drained or moderately well drained.

*Group BB.* The soils of this group formed in a variety of parent materials, such as colluvium, alluvium, and limestone residuum, and are on uplands, terraces, and footslopes in the western mountains, Piedmont, and Coastal Plain. These soils have fragipans that underlie silty to loamy subsurface horizons that have coarse fragments in some areas, have a limited rooting zone as a result of the fragipan, have a low or moderately low available water capacity, and generally are somewhat poorly drained.

*Group DD.* The soils of this group formed in loamy coastal plain sediments and local alluvium and are on gently sloping uplands and stream terraces. These soils are very deep, have a coarse-loamy subsurface layer, have an arenic or a very thick sandy surface layer in some areas, have a low or moderate available water capacity, and are excessively drained.

*Group EE.* The soils of this group formed in loamy coastal plain sediments and are in low-lying landscape positions. These soils are very deep, have a sandy to coarse-loamy subsurface layer, have water tables that typically are high during some part of the year, have a low available water capacity, and are poorly drained or very poorly drained.

*Group HH.* The soils of this group formed in loamy alluvial sediments and are on flood plains. These soils are very deep, have a fine-loamy or clayey subsurface layer, have a moderate available water capacity, and are moderately well drained or somewhat poorly drained.

*Group LL.* The soils of this group formed in clayey coastal plain sediments on low-lying landscapes. These soils are very deep, have clayey subsurface layers throughout, have a moderate available water capacity, and are somewhat poorly drained or poorly drained.

*Group OO.* The soils of this group formed in loamy and silty coastal plain sediments on terraces and broad, nearly level uplands. These soils are very deep,



have loamy to silty layers throughout, have a high available water capacity, and are poorly drained.

*Group PP.* The soils of this group formed in alluvium in marshes and tidal wetlands. These soils are very deep, have a combination of organic, clayey, or sulfidic material layers, have a water table at or near the soil surface, are saturated most of the time, and are poorly drained or very poorly drained.

*Group QQ.* The soils of this group represent the coastal sand dunes of the tidewater area. These soils are deep, are extremely sandy, have a low available water capacity, and are excessively drained.

The management groups for the map units in the survey area are given in the section "Detailed Soil Map Units" and in table 5.

## Prime Farmland

Table 6 names the map unit in the survey area that is considered prime farmland. This designation does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

*Prime farmland* is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

## Hydric Soils

Table 7 lists the map units that are rated as hydric soils in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of



Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and others, 2002).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The following map units, in general, do not meet the definition of hydric soils because they do not have one of the hydric soil indicators. A portion of these map units, however, may include hydric soils. Onsite investigation is recommended to determine whether hydric soils occur and the location of the included hydric soils.

- 1 Altavista-Urban land complex, 0 to 3 percent slopes
- 2 Augusta-Urban land complex, 0 to 2 percent slopes
- 10 Dragston-Urban land complex, 0 to 2 percent slopes
- 17 Newflat-Urban land complex, 0 to 2 percent slopes
- 19 Peawick-Urban land complex, 0 to 3 percent slopes
- 20 Seabrook-Urban land complex, 0 to 2 percent slopes
- 21A Slagle-Urban land complex, 0 to 2 percent slopes
- 21B Slagle-Urban land complex, 2 to 6 percent slopes
- 26 Udorthents-Dumps complex
- 27 Urban land
- 28 Yemassee-Urban land complex, 0 to 2 percent slopes



## Forestland Productivity and Management

The tables described in this section can help forest owners or managers plan the use of soils for wood crops. They show the potential productivity of the soils for wood crops and rate the soils according to the limitations that affect various aspects of forestland management.

### Forestland Productivity

In table 8, the *potential productivity* of merchantable or *common trees* on a soil is expressed as a site index and as a volume number. The *site index* is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that forest managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability. More detailed information regarding site index is available in the "National Forestry Manual," which is available in local offices of the Natural Resources Conservation Service or on the Internet.

The *volume of wood fiber*, a number, is the yield likely to be produced by the most important tree species. This number, expressed as cubic feet per acre per year and calculated at the age of culmination of the mean annual increment (CMAI), indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

*Trees to manage* are those that are preferred for planting, seeding, or natural regeneration and those that remain in the stand after thinning or partial harvest.

### Forestland Management

In table 9, parts I through V, interpretive ratings are given for various aspects of forestland management. The ratings are both verbal and numerical.

Some rating class terms indicate the degree to which the soils are suited to a specified aspect of forestland management. *Well suited* indicates that the soil has features that are favorable for the specified management aspect and has no limitations. Good performance can be expected, and little or no maintenance is needed. *Moderately suited* indicates that the soil has features that are moderately favorable for the specified management aspect. One or more soil properties are less than desirable, and fair performance can be expected. Some maintenance is needed. *Poorly suited* indicates that the soil has one or more properties that are unfavorable for the specified management aspect. Overcoming the unfavorable properties requires special design, extra maintenance, and costly alteration. *Unsuited* indicates that the expected performance of the soil is unacceptable for the specified management aspect or that extreme measures are needed to overcome the undesirable soil properties.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

Rating class terms for fire damage and seedling mortality are expressed as *low*, *moderate*, and *high*. Where these terms are used, the numerical ratings indicate gradations between the point at which the potential for fire damage or seedling mortality is highest (1.00) and the point at which the potential is lowest (0.00).

The paragraphs that follow indicate the soil properties considered in rating the soils. More detailed information about the criteria used in the ratings is available in the



“National Forestry Manual,” which is available in local offices of the Natural Resources Conservation Service or on the Internet.

For *limitations affecting construction of haul roads and log landings*, the ratings are based on slope, flooding, permafrost, plasticity index, the hazard of soil slippage, content of sand, the Unified classification, rock fragments on or below the surface, depth to a restrictive layer that is indurated, depth to a water table, and ponding. The limitations are described as slight, moderate, or severe. A rating of *slight* indicates that no significant limitations affect construction activities, *moderate* indicates that one or more limitations can cause some difficulty in construction, and *severe* indicates that one or more limitations can make construction very difficult or very costly.

The ratings of *suitability for log landings* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The soils are described as well suited, moderately suited, or poorly suited to use as log landings.

Ratings in the column *soil rutting hazard* are based on depth to a water table, rock fragments on or below the surface, the Unified classification, depth to a restrictive layer, and slope. Ruts form as a result of the operation of forest equipment. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that the soil is subject to little or no rutting, *moderate* indicates that rutting is likely, and *severe* indicates that ruts form readily.

Ratings in the column *hazard of off-road or off-trail erosion* are based on slope and on soil erosion factor K. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance. The hazard is described as slight, moderate, severe, or very severe. A rating of *slight* indicates that erosion is unlikely under ordinary climatic conditions; *moderate* indicates that some erosion is likely and that erosion-control measures may be needed; *severe* indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and *very severe* indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Ratings in the column *hazard of erosion on roads and trails* are based on the soil erosion factor K, slope, and content of rock fragments. The ratings apply to unsurfaced roads and trails. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that little or no erosion is likely; *moderate* indicates that some erosion is likely, that the roads or trails may require occasional maintenance, and that simple erosion-control measures are needed; and *severe* indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.

Ratings in the column *suitability for roads (natural surface)* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The ratings indicate the suitability for using the natural surface of the soil for roads. The soils are described as well suited, moderately suited, or poorly suited to this use.

Ratings in the columns *suitability for hand planting* and *suitability for mechanical planting* are based on slope, depth to a restrictive layer, content of sand, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, moderately suited, poorly suited, or unsuited to these methods of planting. It is assumed that necessary site preparation is completed before seedlings are planted.

Ratings in the column *suitability for use of harvesting equipment* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, and ponding. The soils are described as well suited, moderately suited, or poorly suited to this use.



Ratings in the column *suitability for mechanical site preparation (surface)* are based on slope, depth to a restrictive layer, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, poorly suited, or unsuited to this management activity. The part of the soil from the surface to a depth of about 1 foot is considered in the ratings.

Ratings in the column *suitability for mechanical site preparation (deep)* are based on slope, depth to a restrictive layer, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, poorly suited, or unsuited to this management activity. The part of the soil from the surface to a depth of about 3 feet is considered in the ratings.

Ratings in the column *potential for damage to soil by fire* are based on texture of the surface layer, content of rock fragments and organic matter in the surface layer, thickness of the surface layer, and slope. The soils are described as having a low, moderate, or high potential for this kind of damage. The ratings indicate an evaluation of the potential impact of prescribed fires or wildfires that are intense enough to remove the duff layer and consume organic matter in the surface layer.

Ratings in the column *potential for seedling mortality* are based on flooding, ponding, depth to a water table, content of lime, reaction, salinity, available water capacity, soil moisture regime, soil temperature regime, aspect, and slope. The soils are described as having a low, moderate, or high potential for seedling mortality.

## Recreational Development

The soils of the survey area are rated in table 10, parts I and II, according to limitations that affect their suitability for recreational development. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings in the table are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in this table can be supplemented by other information in this survey, for example, interpretations for dwellings without basements, for local roads and streets, and for septic tank absorption fields.

*Camp areas* require site preparation, such as shaping and leveling the tent and



parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas. The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, saturated hydraulic conductivity ( $K_{sat}$ ), and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, saturated hydraulic conductivity ( $K_{sat}$ ), and toxic substances in the soil.

*Picnic areas* are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, saturated hydraulic conductivity ( $K_{sat}$ ), and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, saturated hydraulic conductivity ( $K_{sat}$ ), and toxic substances in the soil.

*Playgrounds* require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, saturated hydraulic conductivity ( $K_{sat}$ ), and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, saturated hydraulic conductivity ( $K_{sat}$ ), and toxic substances in the soil.

*Paths and trails* for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

*Off-road motorcycle trails* require little or no site preparation. They are not covered with surfacing material or vegetation. Considerable compaction of the soil material is likely. The ratings are based on the soil properties that influence erodibility, trafficability, dustiness, and the ease of revegetation. These properties are stoniness, slope, depth to a water table, ponding, flooding, and texture of the surface layer.

*Golf fairways* are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter



in the surface layer. The suitability of the soil for traps, tees, roughs, and greens is not considered in the ratings.

## Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the data in the tables described under the heading "Soil Properties."

*Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.*

*The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.*

*Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.*

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet of the surface, soil wetness, depth to a water table, ponding, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, saturated hydraulic conductivity ( $K_{sat}$ ), corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, reclamation material, roadfill, and topsoil; plan structures for water management; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

## Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Table 11, parts I and II, show the degree and kind of soil limitations that



affect dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

*Dwellings* are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

*Small commercial buildings* are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

*Local roads and streets* have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.



*Shallow excavations* are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

*Lawns and landscaping* require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

## Sanitary Facilities

Table 12, parts I and II, show the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

*Septic tank absorption fields* are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches or between a depth of 24 inches and a restrictive layer is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Saturated hydraulic conductivity ( $K_{sat}$ ), depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

*Sewage lagoons* are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level



floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, saturated hydraulic conductivity ( $K_{sat}$ ), depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Saturated hydraulic conductivity ( $K_{sat}$ ) is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a  $K_{sat}$  rate of more than 14 micrometers per second are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

A *trench sanitary landfill* is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in the table are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include saturated hydraulic conductivity ( $K_{sat}$ ), depth to bedrock or a cemented pan, depth to a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an *area sanitary landfill*, solid waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. A final cover of soil material at least 2 feet thick is placed over the completed landfill. The ratings in the table are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, saturated hydraulic conductivity ( $K_{sat}$ ), depth to a water table, ponding, slope, and depth to bedrock or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If the downward movement of water through the soil



profile is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

*Daily cover for landfill* is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The ratings in the table also apply to the final cover for a landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. These properties include soil texture, depth to a water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium, or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

## Construction Materials

Table 13, parts I and II, give information about the soils as potential sources of gravel, sand, reclamation material, roadfill, and topsoil. Normal compaction, minor processing, and other standard construction practices are assumed.

*Gravel* and *sand* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 13, part I, only the likelihood of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the bottom layer of the soil contains sand or gravel, the soil is considered a likely source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness.

The soils are rated *good*, *fair*, or *poor* as potential sources of sand and gravel. A rating of *good* or *fair* means that the source material is likely to be in or below the soil. The bottom layer and the thickest layer of the soils are assigned numerical ratings. These ratings indicate the likelihood that the layer is a source of sand or gravel. The number 0.00 indicates that the layer is a poor source. The number 1.00 indicates that the layer is a good source. A number between 0.00 and 1.00 indicates the degree to which the layer is a likely source.

In table 13, part II, the rating class terms are *good*, *fair*, and *poor*. The features that limit the soils as sources of reclamation material, roadfill, and topsoil are specified in the table. The numerical ratings given after the specified features indicate the degree to which the features limit the soils as sources of these materials. The lower the number, the greater the limitation.

*Reclamation material* is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical



sequence. The reconstructed soil favors plant growth. The ratings in the table do not apply to quarries and other mined areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion and stability of the surface and the productive potential of the reconstructed soil.

These properties include the content of sodium, salts, and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; and content of organic matter and other features that affect fertility.

*Roadfill* is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

*Topsoil* is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area. The ratings are based on the soil properties that affect plant growth; the ease of excavating, loading, and spreading the material; and reclamation of the borrow area. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

## Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).



*Pond reservoir areas* hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the saturated hydraulic conductivity ( $K_{sat}$ ) of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

*Embankments, dikes, and levees* are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. Embankments that have zoned construction (core and shell) are not considered. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

*Aquifer-fed excavated ponds* are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.







# Soil Properties

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Data relating to soil properties are collected during the course of the soil survey.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine particle-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering properties, physical and chemical properties, and pertinent soil and water features.

## Engineering Properties

Table 15 gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

*Depth* to the upper and lower boundaries of each layer is indicated.

*Texture* is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

*Classification* of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group



index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

*Rock fragments* larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

*Percentage (of soil particles) passing designated sieves* is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

*Liquid limit* and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

## Physical Soil Properties

Table 16 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

*Depth* to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

*Sand* as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In the table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

*Silt* as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In the table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

*Clay* as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In the table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity ( $K_{sat}$ ), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

*Moist bulk density* is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at  $1/3$ - or  $1/10$ -bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil



properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

*Saturated hydraulic conductivity ( $K_{sat}$ )* refers to the ability of a soil to transmit water or air. The estimates in the table indicate the rate of water movement, in micrometers per second, when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity ( $K_{sat}$ ) is considered in the design of soil drainage systems and septic tank absorption fields.

*Available water capacity* refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

*Linear extensibility* refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at  $1/3$ - or  $1/10$ -bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

*Organic matter* is the plant and animal residue in the soil at various stages of decomposition. In the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

*Erosion factors* are shown in the table as the K factor ( $K_w$  and  $K_f$ ) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity ( $K_{sat}$ ). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

*Erosion factor  $K_w$*  indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

*Erosion factor  $K_f$*  indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

*Erosion factor T* is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

*Wind erodibility groups* are made up of soils that have similar properties affecting



their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook," which is available in local offices of the Natural Resources Conservation Service or on the Internet.

*Wind erodibility index* is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

## Chemical Soil Properties

Table 17 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

*Depth* to the upper and lower boundaries of each layer is indicated.

*Cation-exchange capacity* is the total amount of extractable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

*Effective cation-exchange capacity* refers to the sum of extractable cations plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

*Soil reaction* is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

*Salinity* is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

*Sodium adsorption ratio* (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced saturated hydraulic conductivity ( $K_{sat}$ ) and aeration, and a general degradation of soil structure.

## Water Features

Table 18 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

*Hydrologic soil groups* are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.



The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

*Surface runoff* refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

*Water table* refers to a saturated zone in the soil. The table indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

*Ponding* is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. The table indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

*Flooding* is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

*Duration* and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1



to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

## Soil Features

Table 19 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

*Potential for frost action* is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, saturated hydraulic conductivity ( $K_{sat}$ ), content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

*Risk of corrosion* pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.



# Classification of the Soils

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The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1999 and 2006). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 20 lists the classification of the soil series in the survey area. The categories are defined in the following paragraphs.

**ORDER.** Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

**SUBORDER.** Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

**GREAT GROUP.** Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that has a udic moisture regime).

**SUBGROUP.** Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

**FAMILY.** Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, semiactive, thermic Typic Hapludults.

**SERIES.** The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The State series is an example of fine-loamy, mixed, semiactive, thermic Typic Hapludults.

## Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each



series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (Soil Survey Division Staff, 1993) and in the "Field Book for Describing and Sampling Soils" (Schoeneberger and others, 2002). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (Soil Survey Staff, 1999) and in "Keys to Soil Taxonomy" (Soil Survey Staff, 2006). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

## **Altavista Series**

*Physiographic province:* Coastal Plain

*Landform:* Uplands

*Parent material:* Loamy fluviomarine sediments

*Drainage class:* Moderately well drained

*Slowest saturated hydraulic conductivity:* Moderately high

*Slope range:* 0 to 3 percent

### **Associated Soils**

- Augusta soils, which are somewhat poorly drained
- Bojac soils, which are well drained and have less clay in the subsoil than the Altavista soils
- Dragston soils, which are somewhat poorly drained and have less clay in the subsoil than the Altavista soils
- Munden soils, which have less clay in the subsoil than the Altavista soils
- Nimmo soils, which are poorly drained and have less clay in the subsoil than the Altavista soils
- Tomotley soils, which are poorly drained

### **Taxonomic Classification**

Fine-loamy, mixed, semiactive, thermic Aquic Hapludults

### **Typical Pedon**

Altavista fine sandy loam in an area of Altavista-Urban land complex, 0 to 3 percent slopes; located in a cultivated area, 1.7 miles northeast of the junction of Highways VA-623 and VA-627, about 1.1 miles northwest of the mouth of Parsons Creek, 1.0 mile southwest of the tip of Old Neck marsh; elevation of 10 feet; Brandon, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 21 minutes 26.00 seconds N. and long. 76 degrees 53 minutes 19.00 seconds W.

Ap—0 to 11 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; friable, slightly sticky, nonplastic; few fine roots; common fine tubular pores; moderately acid; clear smooth boundary.

BE—11 to 16 inches; light yellowish brown (10YR 6/4) loam; weak fine granular structure; friable, slightly sticky, nonplastic; few fine roots; common fine tubular and few fine vesicular pores; few fine mica flakes; strongly acid; clear smooth boundary.

Bt1—16 to 28 inches; light olive brown (2.5Y 5/4) loam; moderate fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; common fine and medium tubular pores; few faint clay films on all faces of peds; few fine mica flakes; very strongly acid; clear smooth boundary.

Bt2—28 to 37 inches; light olive brown (2.5Y 5/4) clay loam; weak fine and medium subangular blocky structure; friable, moderately sticky, moderately plastic; few fine roots; common fine tubular pores; common distinct clay films on all faces of peds;



common fine prominent gray (10YR 6/1) iron depletions; few fine mica flakes; very strongly acid; clear smooth boundary.

Bt3—37 to 49 inches; yellowish brown (10YR 5/8) and strong brown (7.5YR 5/6) loam; weak medium subangular blocky structure; friable, moderately sticky, moderately plastic; few fine roots; common fine and medium tubular pores; common faint clay films on all faces of peds; common medium prominent gray (10YR 6/1) iron depletions; few fine mica flakes; very strongly acid; clear smooth boundary.

Btg—49 to 62 inches; gray (10YR 6/1) sandy clay loam; weak medium subangular blocky structure; friable, moderately sticky, moderately plastic; few fine tubular pores; common distinct discontinuous clay films on vertical faces of peds; common medium prominent light olive brown (2.5Y 5/4) and yellowish brown (10YR 5/6) masses of oxidized iron; few fine mica flakes; extremely acid; clear smooth boundary.

Cg—62 to 74 inches; gray (10YR 6/1) stratified fine sandy loam to loamy fine sand to fine sand; single grain; friable, slightly sticky, nonplastic; compact in place; common medium prominent yellowish brown (10YR 5/6) masses of oxidized iron; few fine mica flakes; extremely acid.

### Range in Characteristics

*Solum thickness:* 30 to 60 inches or more

*Reaction:* Extremely acid to moderately acid throughout the profile, except where lime has been applied

*Rock fragments:* 0 to 5 percent in the A, E, and B horizons; 0 to 35 percent in the C horizons

*Mica flakes:* Few or common in the B and C horizons

#### *A or Ap horizon:*

Hue—7.5YR to 2.5Y

Value—4 to 6

Chroma—1 to 4

Texture—sandy loam, fine sandy loam, or loam

#### *E horizon (where present):*

Hue—10YR or 2.5Y

Value—5 to 7

Chroma—3 to 8

Texture—sandy loam, fine sandy loam, or loam

#### *BE horizon:*

Hue—7.5YR to 2.5Y

Value—5 to 7

Chroma—3 to 8

Texture—fine sandy loam, loam, or sandy clay loam

#### *Bt horizon:*

Hue—7.5YR to 2.5Y

Value—5 to 7

Chroma—3 to 8

Texture—fine sandy loam, loam, sandy clay loam, or clay loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red; iron depletions within the upper 24 inches of the Bt horizon

#### *Btg horizon:*

Hue—10YR or 2.5Y

Value—5 to 7

Chroma—1 or 2



## Soil Survey of Tidewater Cities Area, Virginia

Texture—fine sandy loam, loam, sandy clay loam, or clay loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

### *BC horizon (where present):*

Hue—7.5YR to 2.5Y

Value—5 to 7

Chroma—3 to 8

Texture—fine sandy loam, loam, or sandy clay loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

### *C horizon (where present):*

Hue—7.5YR to 2.5Y

Value—4 to 7

Chroma—3 to 8

Texture (fine-earth fraction)—stratified sand, fine sand, loamy fine sand, sandy loam, or fine sandy loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

### *Cg horizon:*

Hue—7.5YR to 2.5Y

Value—4 to 7

Chroma—1 or 2

Texture (fine-earth fraction)—stratified sand, fine sand, loamy fine sand, sandy loam, or fine sandy loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

## **Augusta Series**

*Physiographic province:* Coastal Plain

*Landform:* Marine terraces

*Parent material:* Loamy fluviomarine sediments

*Drainage class:* Somewhat poorly drained

*Slowest saturated hydraulic conductivity:* Moderately high

*Slope range:* 0 to 2 percent

### **Associated Soils**

- Altavista soils, which are moderately well drained
- Dragston soils, which have less clay in the subsoil than the Augusta soils
- Munden soils, which are moderately well drained and have less clay in the subsoil than the Augusta soils
- Tomotley soils, which are poorly drained

### **Taxonomic Classification**

Fine-loamy, mixed, semiactive, thermic Aeric Endoaquults

### **Typical Pedon**

Augusta fine sandy loam in an area of Augusta-Urban land complex, 0 to 2 percent slopes; located in a cultivated area, 0.4 mile east of the junction of Highways VA-614 and VA-155, about 30 yards north of Highway VA-614; Providence Forge, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 24 minutes 47.00 seconds N. and long. 77 degrees 2 minutes 24.00 seconds W.



## Soil Survey of Tidewater Cities Area, Virginia

- Ap—0 to 8 inches; brown (10YR 5/3) fine sandy loam; weak fine granular structure; friable, slightly sticky, nonplastic; common fine and few medium and coarse roots; common fine and medium tubular pores; 2 percent rounded quartz gravel; moderately acid; abrupt smooth boundary.
- E—8 to 13 inches; pale brown (10YR 6/3) sandy loam; weak medium granular structure; friable, slightly sticky, slightly plastic; common fine roots; common fine and medium tubular pores; common medium distinct gray (10YR 6/1) iron depletions; moderately acid; clear smooth boundary.
- Bt—13 to 27 inches; light olive brown (2.5Y 5/4) sandy clay loam; moderate medium subangular blocky structure; friable, moderately sticky, moderately plastic; common fine roots; common fine and medium tubular pores; few faint clay films on all faces of peds; few fine prominent light gray (10YR 7/1) iron depletions; very strongly acid; gradual smooth boundary.
- BCg—27 to 40 inches; light gray (10YR 7/1) sandy loam; weak medium subangular blocky structure; friable, moderately sticky, moderately plastic; few fine roots; common fine and medium tubular pores; few faint clay films on all faces of peds; many medium distinct olive brown (2.5Y 4/4) masses of oxidized iron; few fine mica flakes; very strongly acid; gradual smooth boundary.
- Cg1—40 to 51 inches; grayish brown (2.5Y 5/2) gravelly loamy sand; single grain; loose; few fine and medium tubular pores; common medium distinct light gray (10YR 7/1) iron depletions and many coarse prominent reddish brown (5YR 4/4) masses of oxidized iron; few fine mica flakes; 20 percent rounded quartz gravel; very strongly acid; abrupt smooth boundary.
- Cg2—51 to 72 inches; light brownish gray (10YR 6/2) stratified loamy sand to gravelly loamy sand; single grain; loose; many coarse prominent strong brown (7.5YR 4/6) masses of oxidized iron; 18 percent rounded quartz gravel; strongly acid.

### Range in Characteristics

*Solum thickness:* 40 to 80 inches

*Reaction:* Very strongly acid to moderately acid throughout the profile, except where lime has been applied

*Rock fragments:* 0 to 5 percent in the A, E, and B horizons; 0 to 20 percent in the C horizons

*Mica flakes:* None to common throughout the profile

#### *A or Ap horizon:*

Hue—10YR or 2.5Y

Value—4 to 6

Chroma—2 to 4

Texture—sandy loam, fine sandy loam, or loam

#### *E horizon:*

Hue—10YR to 5Y

Value—5 to 7

Chroma—2 to 4

Texture—sandy loam, fine sandy loam, or loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

#### *BE horizon (where present):*

Hue—10YR to 5Y

Value—5 to 7

Chroma—3 to 8

Texture—sandy loam, fine sandy loam, or loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red



*Bt horizon:*

Hue—10YR or 2.5Y

Value—5 or 6

Chroma—3 to 6

Texture—loam, sandy clay loam, or clay loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Btg horizon (where present):*

Hue—10YR to 5Y

Value—5 to 7

Chroma—1 or 2

Texture—loam, sandy clay loam, or clay loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*BCg horizon:*

Hue—10YR or 2.5Y

Value—5 to 7

Chroma—1 or 2

Texture—sandy loam, loam, sandy clay loam, or clay loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Cg horizon:*

Hue—10YR to 5Y

Value—5 to 7

Chroma—1 or 2

Texture (fine-earth fraction)—loamy sand, sandy loam, loam, or stratified with pockets of sandy loam and sand

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

## **Axis Series**

*Physiographic province:* Coastal Plain

*Landform:* Marshes

*Parent material:* Loamy marine deposits

*Drainage class:* Very poorly drained

*Slowest saturated hydraulic conductivity:* Moderately high

*Slope range:* 0 to 2 percent

### **Associated Soils**

- Johnston soils, which have less sulfur than the Axis soils and are on adjacent flood plains
- Tomotley soils, which are poorly drained
- Bohicket soils, which have more clay and less sulfur than the Axis soils
- Lawnes soils, which have less salt than the Axis soils

### **Taxonomic Classification**

Coarse-loamy, mixed, superactive, nonacid, thermic Typic Sulfaquents

### **Typical Pedon**

Axis very fine sandy loam, 0 to 2 percent slopes, very frequently flooded; York County, Virginia; located 0.47 mile north of the junction of highways VA-622 and VA-617, about



300 feet northwest of Highway VA-712; Poquoson West, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 11 minutes 46.00 seconds N. and long. 76 degrees 24 minutes 6.00 seconds W.

- A—0 to 14 inches; very dark grayish brown (10YR 3/2) very fine sandy loam; massive; slightly sticky, slightly plastic; many fine and medium roots; moderately acid; flows through fingers when squeezed and leaves residue in hand; clear smooth boundary.
- Cg1—14 to 35 inches; gray (5Y 5/1) very fine sandy loam; massive; slightly sticky, slightly plastic; few fine prominent dark yellowish brown (10YR 4/4) and common medium distinct olive (5Y 5/4) masses of oxidized iron; moderate sulfur odor; moderately acid; gradual smooth boundary.
- Cg2—35 to 50 inches; dark gray (5Y 4/1) fine sandy loam; massive; slightly sticky, slightly plastic; common medium distinct olive (5Y 5/4) masses of oxidized iron; moderate sulfur odor; slightly alkaline; gradual smooth boundary.
- Cg3—50 to 70 inches; light olive brown (2.5Y 5/4) and gray (5Y 6/1) fine sandy loam; massive; nonsticky, nonplastic; few fine mica flakes; moderate sulfur odor; moderately alkaline.

### Range in Characteristics

*Reaction:* Moderately acid to moderately alkaline in a natural state; ranges to extremely acid within a depth of 40 inches in some pedons when dry

*A horizon:*

Hue—10YR to 5Y

Value—3

Chroma—1 or 2

Texture—very fine sandy loam, fine sandy loam, silt loam, sandy loam, or the mucky analogues of these textures

*Cg horizon:*

Hue—2.5Y or 5Y or neutral with value of 4 to 7

Value—4 to 7

Chroma—1 or 2

Texture—very fine sandy loam, fine sandy loam, sandy loam, or loam

## Bethera Series

*Physiographic province:* Coastal Plain

*Landform:* Stream terraces and upland flats

*Parent material:* Clayey marine sediments

*Drainage class:* Poorly drained

*Slowest saturated hydraulic conductivity:* Moderately low

*Slope range:* 0 to 2 percent

### Associated Soils

- Tomotley soils, which are poorly drained
- Slagle soils, which are moderately well drained and have less clay in the subsoil than the Bethera soils
- Altavista and Augusta soils, which have less clay than the Bethera soils and are better drained
- Newflat and Peawick soils, which are better drained than the Bethera soils

### Taxonomic Classification

Fine, mixed, semiactive, thermic Typic Paleaquults



### Typical Pedon

Bethera silt loam in an area of Bethera-Urban land complex, 0 to 2 percent slopes; located in an area of woodland, 0.6 mile north-northeast of the junction of Highways VA-618 and VA-602, about 200 yards west of Highway VA-618; Providence Forge, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 24 minutes 5.00 seconds N. and long. 77 degrees 5 minutes 54.00 seconds W.

A1—0 to 4 inches; dark gray (10YR 4/1) silt loam; moderate fine and medium granular structure; friable, slightly sticky, slightly plastic; many fine and few coarse roots; extremely acid; clear smooth boundary.

A2—4 to 7 inches; dark gray (10YR 4/1) silt loam; moderate fine granular structure; friable, slightly sticky, slightly plastic; common fine and few coarse roots; many very fine tubular pores; few fine prominent yellowish brown (10YR 5/6) masses of oxidized iron; extremely acid; clear smooth boundary.

E—7 to 12 inches; gray (5Y 6/1) silt loam; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine and coarse roots; many very fine tubular pores; many fine prominent strong brown (7.5YR 5/8) masses of oxidized iron; very strongly acid; clear smooth boundary.

Btg1—12 to 40 inches; light gray (5Y 7/1) clay loam; strong medium subangular blocky structure; firm, moderately sticky, moderately plastic; few fine and coarse roots; many very fine tubular pores; few faint clay films on surfaces along pores and common distinct clay films on all faces of peds; many fine prominent yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), and yellowish red (5YR 5/6) masses of oxidized iron; very strongly acid; gradual smooth boundary.

Btg2—40 to 72 inches; light gray (5Y 7/1) clay loam; moderate medium subangular blocky structure; firm, moderately sticky, moderately plastic; few fine roots; few very fine tubular pores; few faint clay films on surfaces along pores and common distinct clay films on all faces of peds; few coarse prominent dark yellowish brown (10YR 3/6) and strong brown (7.5YR 5/6) masses of oxidized iron; very strongly acid.

### Range in Characteristics

*Solum thickness:* 60 to 80 inches or more

*Reaction:* Extremely acid to moderately acid throughout the profile

#### *A or Ap horizon:*

Hue—10YR or 2.5Y

Value—2 to 4

Chroma—1 or 2

Texture—fine sandy loam, loam, or silt loam

Redoximorphic features—masses of oxidized iron in shades of brown, yellow, and red

#### *E horizon:*

Hue—10YR to 5Y

Value—4 to 6

Chroma—1 or 2

Texture—fine sandy loam, loam, or silt loam

Redoximorphic features—masses of oxidized iron in shades of brown, yellow, and red

#### *BEg horizon (where present):*

Hue—10YR to 5Y

Value—4 to 6

Chroma—1 or 2

Texture—loam, silt loam, or clay loam



Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Btg horizon:*

Hue—10YR to 5Y or neutral with value of 4 to 7

Value—4 to 7

Chroma—1 or 2

Texture—clay loam, silty clay loam, sandy clay, silty clay, or clay

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Cg horizon (where present):*

Hue—10YR to 5BG or neutral with value of 5 to 7

Value—5 to 7

Chroma—1 or 2

Texture—sandy clay loam, sandy clay, or clay

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

## **Bohicket Series**

*Physiographic province:* Coastal Plain

*Landform:* Tidal marshes

*Parent material:* Loamy and clayey alluvial sediments

*Drainage class:* Very poorly drained

*Slowest saturated hydraulic conductivity:* Low

*Slope range:* 0 to 1 percent

### **Associated Soils**

- Levy soils, which are very poorly drained and are in freshwater marshes
- Johnston soils, which have less clay and less sulfur than the Bohicket soils and are on flood plains
- Axis soils, which have less clay and more sulfur than the Bohicket soils

### **Taxonomic Classification**

Fine, mixed, superactive, nonacid, thermic Typic Sulfaquents

### **Typical Pedon**

Bohicket muck, 0 to 1 percent slopes, very frequently flooded; located in an area of saltwater grasses, 0.38 mile north of the junction of Highway VA-30 and the Mattaponi River Bridge at West Point; West Point, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 32 minutes 40.00 seconds N. and long. 76 degrees 47 minutes 12.00 seconds W.

Ag—0 to 8 inches; gray (5Y 5/1) silty clay loam, muck; massive; slightly sticky, slightly plastic; many fine and medium roots; material flows easily between fingers when squeezed; neutral; gradual wavy boundary.

Cg1—8 to 29 inches; dark greenish gray (5GY 4/1) silty clay loam; massive; moderately sticky, slightly plastic; few fine roots; material flows very easily between fingers when squeezed; strong sulfur odor; slightly alkaline; gradual wavy boundary.

Cg2—29 to 65 inches; dark greenish gray (5GY 4/1) silty clay; massive; moderately sticky, moderately plastic; material flows very easily between fingers when squeezed; moderate sulfur odor; moderately alkaline.



### Range in Characteristics

*Soil reaction:* Slightly acid to moderately alkaline; extremely acid upon drying

*Organic layer thickness (where present):* 1 to 16 inches

*Organic layer (where present):*

Organic material—sapric or hemic

*Ag horizon:*

Hue—10YR to 5G or neutral with value of 2 to 5

Value—2 to 5

Chroma—1 or 2

Texture—silty clay loam, silty clay, or clay

*Cg horizon (upper part):*

Hue—10YR to 5BG or neutral with value of 2 to 7

Value—2 to 7

Chroma—1 or 2

Texture—clay loam, silty clay loam, sandy clay, clay, or silty clay or the mucky analogues of these textures

*Cg horizon (lower part):*

Hue—10YR to 5BG or neutral with value of 2 to 7

Value—2 to 7

Chroma—1 or 2

Texture—ranging from sand to clay or the mucky analogues of these textures

## Bojac Series

*Physiographic province:* Coastal Plain

*Landform:* Marine terraces

*Parent material:* Loamy and sandy fluviomarine deposits

*Drainage class:* Well drained

*Slowest saturated hydraulic conductivity:* High

*Slope range:* 0 to 3 percent

### Associated Soils

- Altavista soils, which are moderately well drained and have more clay in the subsoil than the Bojac soils
- Munden soils, which are moderately well drained
- Dragston and Nimmo soils, which are poorly drained
- Seabrook soils, which have less clay in the subsoil than the Bojac soils and are moderately well drained

### Taxonomic Classification

Coarse-loamy, mixed, semiactive, thermic Typic Hapludults

### Typical Pedon

Bojac loamy fine sand in an area of Bojac-Urban land complex, 0 to 3 percent slopes; located in a cultivated area, 0.7 mile southeast of the end of Highway VA-619, about 1.5 miles southwest of the mouth of Kittewan Creek, 1.2 miles northeast of the tip of Weyanoke Point; Charles City, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 17 minutes 21.00 seconds N. and long. 77 degrees 3 minutes 45.00 seconds W.

Ap—0 to 10 inches; dark brown (7.5YR 3/4) loamy fine sand; weak fine granular structure; very friable, nonsticky, nonplastic; common fine roots; common fine and



medium tubular pores; few fine mica flakes; very strongly acid; clear smooth boundary.

Bt—10 to 35 inches; brown (7.5YR 4/4) sandy loam; weak coarse subangular blocky structure; very friable, slightly sticky, slightly plastic; few fine roots; common fine and medium tubular pores; common clay bridges between sand grains and many clay films on all faces of peds; few fine mica flakes; moderately acid; gradual smooth boundary.

C—35 to 70 inches; strong brown (7.5YR 4/6) loamy sand; single grain; loose; common fine and medium tubular pores; common fine mica flakes; slightly acid.

### Range in Characteristics

*Reaction:* Extremely acid to slightly acid throughout the profile, except where lime has been applied

*Rock fragments:* 0 to 5 percent in the A, E, and B horizons; 0 to 15 percent in the C horizon

*Mica flakes:* Few or common in the B and C horizons

#### *A horizon:*

Hue—7.5YR to 2.5Y

Value—3

Chroma—1 or 2

Texture—loamy fine sand, sandy loam, or fine sandy loam

#### *Ap horizon (where present):*

Hue—7.5YR to 2.5Y

Value—3 to 6

Chroma—1 to 4

Texture—loamy fine sand, sandy loam, or fine sandy loam

#### *E horizon (where present):*

Hue—10YR or 2.5Y

Value—4 to 7

Chroma—4 or 6

Texture—loamy fine sand, sandy loam, or fine sandy loam

#### *BE horizon (where present):*

Hue—7.5YR to 2.5Y

Value—4 to 6

Chroma—4 or 6

Texture—sandy loam, fine sandy loam, or loam

#### *Bt horizon:*

Hue—5YR to 10YR

Value—4 to 6

Chroma—4 to 8

Texture—sandy loam, fine sandy loam, or loam or a thin subhorizon of sandy clay loam or clay loam

Redoximorphic features—iron depletions in shades of olive and gray below a depth of 40 inches

#### *BC horizon (where present):*

Hue—5YR to 10YR

Value—4 to 6

Chroma—4 to 8

Texture—loamy sand or loamy fine sand



Redoximorphic features—iron depletions in shades of olive and gray below a depth of 40 inches and masses of oxidized iron in shades of brown, yellow, and red

*C horizon:*

Hue—7.5YR to 2.5Y

Value—4 to 7

Chroma—3 to 8

Texture—typically stratified coarse sand to loamy fine sand

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

## **Chickahominy Series**

*Physiographic province:* Coastal Plain

*Landform:* Stream terraces

*Parent material:* Clayey alluvial sediments

*Drainage class:* Poorly drained

*Slowest saturated hydraulic conductivity:* Low

*Slope range:* 0 to 2 percent

### **Associated Soils**

- Peawick soils, which are moderately well drained
- Newflat soils, which are somewhat poorly drained
- Altavista and Augusta soils, which have less clay than the Chickahominy soils and are better drained
- State soils, which have less clay than the Chickahominy soils and are better drained

### **Taxonomic Classification**

Fine, mixed, active, thermic Typic Endoaquults

### **Typical Pedon**

Chickahominy silt loam in an area of Chickahominy-Urban land complex, 0 to 2 percent slopes; located in an area of woodland, 1.2 miles northwest of where Highway VA-5 crosses the Chickahominy River, 30 yards south of Highway VA-5, about 1.3 miles north of the mouth of Tomahund Creek, 0.9 mile southwest of the mouth of Morris Creek; Brandon, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 16 minutes 6.00 seconds N. and long. 76 degrees 53 minutes 16.00 seconds W.

A—0 to 2 inches; dark grayish brown (2.5Y 4/2) silt loam; moderate fine and medium granular structure; friable, moderately sticky, slightly plastic; many fine, medium, and coarse roots; few fine tubular pores; extremely acid; abrupt smooth boundary.

Eg—2 to 5 inches; dark grayish brown (10YR 4/2) loam; moderate medium subangular blocky structure; friable, moderately sticky, moderately plastic; many fine, medium, and coarse roots; common very fine tubular pores; common fine prominent light olive brown (2.5Y 5/4) masses of oxidized iron; extremely acid; clear smooth boundary.

Btg1—5 to 35 inches; grayish brown (10YR 5/2) clay; strong fine and medium subangular blocky structure; firm, very sticky, very plastic; few fine roots; many distinct clay films on all faces of peds; common fine prominent yellowish brown (10YR 5/6) masses of oxidized iron; few fine mica flakes; extremely acid; gradual smooth boundary.

Btg2—35 to 50 inches; gray (5Y 5/1) clay; strong medium and coarse angular blocky structure; firm, very sticky, very plastic; few fine roots; many distinct clay films on



all faces of peds; many coarse prominent yellowish brown (10YR 5/6) masses of oxidized iron; extremely acid; gradual wavy boundary.  
Btg3—50 to 64 inches; gray (10YR 6/1) clay; moderate medium subangular blocky and moderate medium angular blocky structure; firm, very sticky, very plastic; many distinct clay films on all faces of peds; common medium prominent yellowish brown (10YR 5/6) masses of oxidized iron; very strongly acid.

### Range in Characteristics

*Solum thickness:* 60 to 80 inches or more

*Reaction:* Extremely acid to strongly acid throughout the profile, except where lime has been applied

*Rock fragments:* 0 to 2 percent rounded quartz gravel in the A, E and B horizons

*A horizon:*

Hue—10YR to 5Y

Value—3 to 6

Chroma—1 or 2

Texture—very fine sandy loam, loam, or silt loam

*Eg horizon:*

Hue—10YR to 5Y

Value—3 to 6

Chroma—1 or 2

Texture—very fine sandy loam, loam, or silt loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*BEg horizon (where present):*

Hue—10YR to 5Y or neutral with value of 4 to 6

Value—4 to 6

Chroma—1 or 2

Texture—loam, silt loam, clay loam, or silty clay loam

Redoximorphic features—masses of oxidized iron in shades of brown, yellow, and red

*Btg horizon:*

Hue—10YR to 5Y or neutral with value of 4 to 7

Value—4 to 7

Chroma—1 or 2

Texture—clay loam, silty clay loam, silty clay, or clay

Redoximorphic features—masses of oxidized iron in shades of brown, yellow, and red

*Cg horizon (where present):*

Hue—10YR to 5Y or neutral with value of 4 to 7

Value—4 to 7

Chroma—1 or 2

Texture—stratified; ranging from sand to clay

Redoximorphic features—masses of oxidized iron in shades of brown, yellow, and red

## Craven Series

*Physiographic province:* Coastal Plain

*Landform:* Marine terraces

*Parent material:* Clayey marine sediments



*Drainage class:* Moderately well drained

*Slowest saturated hydraulic conductivity:* Moderately low

*Slope range:* 0 to 6 percent

### **Associated Soils**

- Nevarc soils, which have a perched water table
- Uchee soils, which are well drained and have thick, sandy surface layers
- Slagle soils, which have less clay in the subsoil than the Craven soils
- Suffolk soils, which have less clay than the Craven soils and are better drained

### **Taxonomic Classification**

Fine, mixed, subactive, thermic Aquic Hapludults

### **Typical Pedon**

Craven fine sandy loam in an area of Craven-Urban land complex, 0 to 2 percent slopes; located in a cultivated area, 70 yards south of the Nance Shop Historic Marker on Highway VA-603, about 0.6 mile west-southwest of the junction of Highways VA-603 and VA-609 at the communication tower, 1.0 mile east-northeast of the junction of Highways VA-603 and VA-605; elevation of 130 feet; Roxbury, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 25 minutes 55.00 seconds N. and long. 77 degrees 8 minutes 57.00 seconds W.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) fine sandy loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; common fine and medium and common coarse roots; common fine and medium tubular pores; strongly acid; abrupt smooth boundary.

Bt1—10 to 22 inches; strong brown (7.5YR 5/6) clay; strong fine angular blocky structure; firm, moderately sticky, moderately plastic; few medium and coarse roots; few fine tubular pores; many distinct clay films on all faces of peds; common fine prominent red (2.5YR 5/8) and distinct yellowish brown (10YR 5/6) masses of oxidized iron; common fine mica flakes; strongly acid; clear smooth boundary.

Bt2—22 to 36 inches; yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) clay; strong fine angular blocky structure; firm, moderately sticky, moderately plastic; common fine and few medium roots; many distinct clay films on all faces of peds; common medium prominent gray (10YR 6/1) iron depletions; many medium distinct red (2.5YR 5/8) and yellowish red (5YR 5/8) masses of oxidized iron; few fine mica flakes; very strongly acid; gradual smooth boundary.

Bt3—36 to 45 inches; strong brown (7.5YR 5/8) clay; strong medium angular blocky structure; firm, moderately sticky, moderately plastic; few fine roots; few distinct clay films on all faces of peds; common medium prominent gray (10YR 6/1) iron depletions; many medium distinct reddish brown (2.5YR 5/4) and yellowish red (5YR 5/8) masses of oxidized iron; few fine mica flakes; extremely acid; gradual smooth boundary.

BCg—45 to 70 inches; light gray (10YR 7/1) clay loam; massive; friable, moderately sticky, moderately plastic; few fine roots; many medium distinct reddish brown (2.5YR 5/4) and strong brown (7.5YR 5/8) masses of oxidized iron; few fine mica flakes; extremely acid.

### **Range in Characteristics**

*Solum thickness:* 40 to 60 inches or more

*Reaction:* Extremely acid to strongly acid throughout the profile, except where lime has been applied

*Rock fragments:* 0 to 3 percent throughout the profile



Soil Survey of Tidewater Cities Area, Virginia

*A horizon (where present):*

Hue—10YR or 2.5Y  
Value—3 to 6  
Chroma—1 to 3  
Texture—fine sandy loam, loam, or silt loam

*Ap horizon:*

Hue—10YR or 2.5Y  
Value—3 to 6  
Chroma—1 to 3  
Texture—fine sandy loam, loam, or silt loam; clay loam in eroded areas

*E horizon (where present):*

Hue—10YR to 5Y  
Value—5 to 7  
Chroma—2 to 4  
Texture—fine sandy loam, loam, or silt loam

*BA or BE horizon (where present):*

Hue—10YR or 2.5Y  
Value—4 to 7  
Chroma—3 to 8  
Texture—loam, sandy clay loam, clay loam, or silty clay loam

*Bt horizon:*

Hue—7.5YR to 2.5Y  
Value—5 to 7  
Chroma—4 to 8  
Texture—clay loam, silty clay loam, silty clay, or clay  
Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Btg horizon:*

Hue—10YR or 2.5Y  
Value—5 to 7  
Chroma—1 or 2  
Texture—clay loam, silty clay loam, silty clay, or clay  
Redoximorphic features—masses of oxidized iron in shades of brown, yellow, and red

*BC or BCg horizon:*

Hue—10YR or 2.5Y  
Value—5 to 7  
Chroma—1 or 2; some pedons have horizons with chroma of 3 or more  
Texture—sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, or clay  
Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*C or Cg horizon (where present):*

Hue—10YR or 2.5Y  
Value—5 to 7  
Chroma—1 to 6  
Texture—loamy sand, sandy loam, sandy clay loam, or clay loam  
Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red



## Dragston Series

*Physiographic province:* Coastal Plain

*Landform:* Marine terraces

*Parent material:* Loamy and sandy sediments

*Drainage class:* Somewhat poorly drained

*Slowest saturated hydraulic conductivity:* High

*Slope range:* 0 to 2 percent

### Associated Soils

- Altavista soils, which are moderately well drained and have more clay in the subsoil than the Dragston soils
- Augusta soils, which have more clay in the subsoil than the Dragston soils
- Munden soils, which are moderately well drained
- Nimmo soils, which are poorly drained
- Seabrook soils, which are moderately well drained and have less clay in the subsoil than the Dragston soils
- Tomotley soils, which are poorly drained and have more clay in the subsoil than the Dragston soils

### Taxonomic Classification

Coarse-loamy, mixed, semiactive, thermic Aeric Endoaquults

### Typical Pedon

Dragston fine sandy loam in an area of Dragston-Urban land complex, 0 to 2 percent slopes; located in an area of woodland, 0.2 mile southwest of a borrow pit on Highway VA-618, about 0.4 mile south-southwest of the crossing of a power line and Highway VA-618, about 0.5 mile south-southwest of a gauging station on the Chickahominy River, 50 yards west of Highway VA-618; Providence Forge, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 25 minutes 54.00 seconds N. and long. 77 degrees 4 minutes 2.00 seconds W.

- A—0 to 4 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine and medium granular structure; friable, slightly sticky, nonplastic; many fine, medium, and coarse roots; common fine and medium tubular pores; very strongly acid; abrupt smooth boundary.
- E—4 to 8 inches; pale brown (10YR 6/3) fine sandy loam; weak fine and medium granular structure; friable, slightly sticky, slightly plastic; many fine, medium, and coarse roots; common fine and medium tubular pores; common medium distinct gray (10YR 6/1) iron depletions; very strongly acid; abrupt smooth boundary.
- BE—8 to 12 inches; pale brown (10YR 6/3) and yellowish brown (10YR 5/6) fine sandy loam; weak fine granular structure; friable, slightly sticky, slightly plastic; few fine roots; common fine and medium tubular pores; very strongly acid; clear smooth boundary.
- Btg—12 to 25 inches; gray (10YR 6/1) fine sandy loam; weak medium subangular blocky structure; friable, moderately sticky, slightly plastic; few fine and medium roots; common fine and medium and common coarse tubular pores; few faint clay films on all faces of peds and few faint clay bridges between sand grains; many coarse prominent yellowish brown (10YR 5/6) masses of oxidized iron; very strongly acid; gradual smooth boundary.
- BC—25 to 35 inches; yellowish brown (10YR 5/6) and brownish yellow (10YR 6/6) loamy fine sand; massive; friable, slightly sticky, slightly plastic; few fine and medium roots; common fine, medium, and coarse tubular pores; few faint clay bridges between sand grains and few faint clay films on all faces of peds; many



medium prominent gray (10YR 6/1) iron depletions; few fine mica flakes; slightly acid; gradual smooth boundary.

C1—35 to 45 inches; yellowish brown (10YR 5/6) sand; single grain; loose; many medium distinct light brownish gray (10YR 6/2) iron depletions; common very fine and fine titanium oxide mineral grains; slightly acid; clear smooth boundary.

C2—45 to 54 inches; dark yellowish brown (10YR 4/4) sand; single grain; loose; common medium distinct brown (10YR 5/3) iron depletions; many very fine and fine titanium oxide mineral grains; slightly acid; clear smooth boundary.

C3—54 to 64 inches; yellowish brown (10YR 5/4) sand; single grain; loose; many coarse distinct grayish brown (10YR 5/2) iron depletions; slightly acid; clear smooth boundary.

C4—64 to 72 inches; dark yellowish brown (10YR 4/6) sandy loam; massive; friable, moderately sticky, moderately plastic; slightly acid; clear smooth boundary.

Cg—72 to 75 inches; greenish gray (5BG 6/1) sandy loam; massive; friable, moderately sticky, moderately plastic; slightly acid.

### Range in Characteristics

*Solum thickness:* 25 to 50 inches

*Reaction:* Very strongly acid or strongly acid in the A and E horizons and in the upper part of the B horizon; very strongly acid to slightly acid in the lower part of the B horizon and in the C horizon

*Rock fragments:* 0 to 2 percent in the A, E, and B horizons; 0 to 10 percent in the C horizons

*A or Ap horizon:*

Hue—10YR to 5Y

Value—2 to 5; value of 3 or less where horizon less than 10 inches thick

Chroma—1 to 4

Texture—loamy sand, loamy fine sand, sandy loam, fine sandy loam, or loam

*E horizon:*

Hue—10YR to 5Y

Value—4 to 7

Chroma—2 to 4

Texture—loamy sand, loamy fine sand, sandy loam, fine sandy loam, or loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*BA or BE horizon:*

Hue—10YR to 5Y

Value—4 to 6

Chroma—3 to 8

Texture—sandy loam, fine sandy loam, or loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Btg horizon:*

Hue—10YR to 5Y or neutral with value of 4 to 6

Value—4 to 6

Chroma—1 or 2

Texture—sandy loam, fine sandy loam, or loam; subhorizon of sandy clay loam in some pedons

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*BC or BCg horizon:*

Hue—10YR to 5Y or neutral with value of 4 to 6



Value—4 to 6

Chroma—1 to 8

Texture—loamy sand, loamy fine sand, sandy loam, or fine sandy loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*C horizon:*

Hue—10YR to 5Y

Value—4 to 7

Chroma—3 to 8

Texture—sand, fine sand, loamy sand, loamy fine sand, or sandy loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Cg horizon:*

Hue—10YR to 5BG or neutral with value of 4 to 7

Value—4 to 7

Chroma—1 or 2

Texture—sand, fine sand, loamy sand, loamy fine sand, or sandy loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

## Duckston Series

*Physiographic province:* Coastal Plain

*Landform:* Depressions between coastal dunes

*Parent material:* Marine sediments

*Drainage class:* Poorly drained

*Slowest saturated hydraulic conductivity:* Very high

*Slope range:* 0 to 2 percent

### Associated Soils

- Axis, Bohicket, Lawnes, and Levy soils, which have more clay, salts, and sulfur than the Duckston soils
- Johnston soils, which have more clay than the Duckston soils and are on adjacent flood plains

### Taxonomic Classification

Siliceous, thermic Typic Psammaquents

### Typical Pedon

Duckston fine sand, 0 to 2 percent slopes, frequently flooded; located 4.0 miles north of the North Carolina-Virginia State line, 2,500 feet west of the Atlantic Ocean, in the city of Virginia Beach; Knotts Island, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 36 degrees 37 minutes 25.00 seconds N. and long. 75 degrees 53 minutes 48.00 seconds W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) fine sand; single grain; loose; common fine and medium roots; extremely acid; few clean sand grains; clear smooth boundary.

Cg1—4 to 15 inches; grayish brown (10YR 5/2) sand; single grain; loose; few black and strong brown fine mineral grains; extremely acid; gradual wavy boundary.

Cg2—15 to 60 inches; gray (10YR 6/1) sand; single grain; loose; common fine roots; few black and strong brown fine mineral grains; extremely acid.



### Range in Characteristics

*Reaction:* Extremely acid to moderately alkaline throughout the profile

*A horizon:*

Hue—10YR to 5Y  
Value—3 or 4  
Chroma—1 or 2  
Texture—fine sand

*Cg horizon:*

Hue—10YR to 5Y or neutral with value of 5 or 6  
Value—5 or 6  
Chroma—1 or 2  
Texture—sand or fine sand

## Johnston Series

*Physiographic province:* Coastal Plain

*Landform:* Flood plains

*Parent material:* Loamy and sandy alluvium

*Drainage class:* Very poorly drained

*Slowest saturated hydraulic conductivity:* High

*Slope range:* 0 to 2 percent

### Associated Soils

- Axis, Bohicket, Lawnes, and Levy soils, which have more salts and sulfur than the Johnston soils and are in marshes
- Altavista soils, which are moderately well drained
- Munden soils, which are moderately well drained
- Augusta soils, which are somewhat poorly drained
- Nimmo soils, which are poorly drained

### Taxonomic Classification

Fine-loamy, siliceous, active, acid, thermic Cumulic Humaquepts

### Typical Pedon

Johnston loam, 0 to 2 percent slopes, frequently flooded; located about 600 feet southeast of the junction of VA-628 and Diascund Creek; Walkers, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 28 minutes 46.00 seconds N. and long. 76 degrees 58 minutes 20.00 seconds W.

A—0 to 24 inches; black (10YR 2/1) loam; weak medium granular structure; very friable, slightly sticky, slightly plastic; many fine and medium roots throughout; very strongly acid; gradual wavy boundary.

Cg1—24 to 30 inches; dark gray (10YR 4/1) sandy loam; massive; very friable, slightly sticky, slightly plastic; few fine roots throughout; very strongly acid; clear smooth boundary.

Cg2—30 to 64 inches; dark grayish brown (10YR 4/2) loamy sand; massive; very friable, slightly sticky, nonplastic; few fine roots throughout; strongly acid.

### Range in Characteristics

*Depth to bedrock:* More than 5 feet

*Other features:* A few inches of recent alluvial sediments over a dark-colored A horizon in some pedons



*A horizon:*

Hue—10YR or 2.5Y or neutral with value of 2 or 3

Value—2 or 3

Chroma—1 to 3

Texture—mucky loam, loam, or sandy loam

*Cg horizon:*

Hue—10YR to 5Y or neutral with value of 4 to 7

Value—4 to 7

Chroma—1 or 2

Texture—loamy sand, sandy loam, or loam

*Note:* The soils mapped as Johnston in the survey area are taxadjuncts to the series because they have a higher clay content and a higher pH value than what is established for the series. These differences, however, do not affect the use and management of the soil.

## Lawnes Series

*Physiographic province:* Coastal Plain

*Landform:* Marshes

*Parent material:* Herbaceous organic materials over loamy alluvial sediments

*Drainage class:* Very poorly drained

*Slowest saturated hydraulic conductivity:* Moderately high

*Slope range:* 0 to 1 percent

### Associated Soils

- Bohicket and Levy soils, which have more clay than the Lawnes soils
- Duckston soils, which have less clay than the Lawnes soils and are intermingled in dunes and marshes

### Taxonomic Classification

Coarse-loamy, mixed, superactive, nonacid, thermic Typic Sulfaquents

### Typical Pedon

Lawnes loam, 0 to 1 percent slopes, very frequently flooded; located in Old Neck marsh, about 2.2 miles northeast of Highways VA-615 and VA-627, about 2.8 miles east of the junction of Highways VA-624 and VA-615 at Holdcroft; Brandon, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 21 minutes 28.00 seconds N. and long. 76 degrees 52 minutes 53.00 seconds W.

A—0 to 13 inches; dark gray (10YR 4/1) loam; 1 percent unrubbed fiber; massive; moderately sticky, slightly plastic; many fine live roots; flows easily between fingers when squeezed; n-value greater than 1; sulfurous odor; strongly acid; clear smooth boundary.

Cg1—13 to 26 inches; dark gray (10YR 4/1) loam; 5 percent rubbed fiber; massive; slightly sticky, slightly plastic; common fine roots; flows easily between fingers when squeezed; n-value greater than 1; common lenses and pockets of clay loam; sulfurous odor; strongly acid; diffuse smooth boundary.

Cg2—26 to 40 inches; very dark gray (10YR 3/1) loam; massive; moderately sticky, slightly plastic; few fine roots; flows easily between fingers when squeezed; n-value greater than 1; common pockets of sapric and hemic material; sulfurous odor; strongly acid; diffuse smooth boundary.

Cg3—40 to 55 inches; very dark gray (10YR 3/1) loam; massive; slightly sticky, slightly



plastic; few fine and medium roots; flows easily between fingers when squeezed; n-value greater than 1; sulfurous odor; strongly acid; gradual smooth boundary.  
Cg4—55 to 62 inches; very dark gray (10YR 3/1) sand; single grain; loose; n-value less than 1; strongly acid.

### Range in Characteristics

*Thickness of organic layer:* 8 to 16 inches

*Reaction:* Strongly acid to neutral throughout the profile in a natural state; extremely acid throughout the soil upon drying

*n-value:* Greater than 0.7 to a depth of 20 inches

*Origin of organic material:* Herbaceous plants

*Organic layer (where present):*

Hue—10YR to 5GY or neutral with value of 2 to 4

Value—2 to 4

Chroma—1 or 2

Texture—muck

Organic material—dominantly hemic; thin surface layer of sapric material in some pedons

*A horizon (where present):*

Hue—10YR to 5Y

Value—3 or 4

Chroma—1 or 2

Texture—sandy loam, fine sandy loam, loam, or silt loam or the mucky analogues of these textures

*Cg horizon:*

Hue—10YR to 5GY or neutral with value of 2 to 5

Value—2 to 5

Chroma—1 or 2

Texture—variable and stratified; clay content less than 18 percent in control section; layers of sandy clay loam, silty clay loam, or clay loam and layers of the mucky analogues of these textures or buried hemist layers (Oeb horizons), or both, below a depth of 40 inches in some pedons

## Levy Series

*Physiographic province:* Coastal Plain

*Landform:* Marshes

*Parent material:* Clayey estuarine sediments

*Drainage class:* Very poorly drained

*Slowest saturated hydraulic conductivity:* Moderately low

*Slope range:* 0 to 2 percent

### Associated Soils

- Axis and Lawnes soils, which have less clay than the Levy soils
- Johnston soils, which have less salt and sulfur than the Levy soils and are on adjacent flood plains
- Bohicket soils, which have more salts and sulfur than the Levy soils

### Taxonomic Classification

Fine, mixed, superactive, acid, thermic Typic Hydraquents



### Typical Pedon

Levy silty clay, 0 to 2 percent slopes, very frequently flooded; located 2.4 miles west-northwest of Claremont, 2.0 miles north-northwest of the junction of Highways VA-613 and VA-654, about 1.5 miles southwest of the mouth of Upper Chippokes Creek, 1.0 mile northwest of the end of Highway VA-654, at the end of an unpaved road, in Upper Chippokes Creek marsh; Savedge, VA, 7.5-minute topographic quadrangle, NAD27; lat. 37 degrees 13 minutes 50.00 seconds N. and long. 77 degrees 0 minutes 33.00 seconds W.

- A—0 to 20 inches; dark olive gray (5Y 3/2) mucky silty clay; massive; very sticky, nonplastic; many live roots; about 10 percent sapric material; n-value greater than 0.7; extremely acid; gradual smooth boundary.
- Cg1—20 to 40 inches; dark gray (5Y 4/1) mucky silty clay; massive; very sticky, nonplastic; common live roots; about 5 percent sapric material; n-value greater than 0.7; extremely acid; gradual smooth boundary.
- Cg2—40 to 60 inches; very dark gray (5Y 3/1) mucky clay; massive; moderately sticky, nonplastic; many live roots; about 5 percent sapric material; n-value greater than 0.7; extremely acid; gradual smooth boundary.
- Cg3—60 to 80 inches; gray (5Y 6/1) and black (5Y 2.5/1) stratified mucky sandy loam to sandy loam; massive; moderately sticky, nonplastic; common live roots; about 5 percent sapric material; very strongly acid.

### Range in Characteristics

*Soil reaction:* Extremely acid to strongly acid to a depth of 40 inches; very strongly acid to slightly alkaline below a depth of 40 inches

*n-value:* More than 0.7 to a depth of 40 inches

#### *O horizons (where present):*

Hue—7.5YR or 10YR

Value—2 to 4

Chroma—1 to 3

Texture—loam, silty clay loam, silty clay, or clay or the mucky analogues of these textures

Organic material—leaves, grasses, twigs, and roots

#### *A horizon:*

Hue—10YR to 5Y or neutral with value of 3 to 7

Value—3 to 7

Chroma—1 to 3

Texture—silt loam, silty clay loam, silty clay, or clay or the mucky analogues of these textures

Redoximorphic features—iron depletions in shades of gray and masses of oxidized iron in shades of red, yellow, and brown

#### *Cg horizon:*

Hue—10YR to 5G

Value—3 to 6

Chroma—1 or 2

Texture—clay or silty clay; stratified sand to clay below a depth of 40 inches; organic layers and mucky analogues below a depth of 40 inches in some pedons

Redoximorphic features—iron depletions in shades of gray and masses of oxidized iron in shades of red, yellow, and brown



## Munden Series

*Physiographic province:* Coastal Plain

*Landform:* Uplands

*Parent material:* Loamy and sandy fluviomarine sediments

*Drainage class:* Moderately well drained

*Slowest saturated hydraulic conductivity:* Moderately high

*Slope range:* 0 to 3 percent

### Associated Soils

- Altavista soils, which have more clay in the subsoil than the Munden soils
- Augusta soils, which are somewhat poorly drained and have more clay in the subsoil than the Munden soils
- Bojac soils, which are well drained
- Dragston soils, which are somewhat poorly drained
- Seabrook soils, which are sandy throughout

### Taxonomic Classification

Coarse-loamy, mixed, semiactive, thermic Aquic Hapludults

### Typical Pedon

Munden loamy fine sand in an area of Munden-Urban land complex, 0 to 3 percent slopes; located in an area of woodland, 1.0 mile west-southwest of Walker's Dam, 170 yards southeast of Binns Bar along the Chickahominy River, 1.7 miles north-northeast of Highway VA-615 on a private road to Walker's Dam, 70 yards north of a farm lane; Walkers, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 23 minutes 44.00 seconds N. and long. 76 degrees 57 minutes 41.00 seconds W.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) loamy fine sand; weak fine granular structure; very friable, nonsticky, nonplastic; common fine and medium and few coarse roots; common fine, medium, and coarse tubular pores; very strongly acid; clear smooth boundary.

E—6 to 14 inches; grayish brown (10YR 5/2) fine sandy loam; weak fine and medium granular structure; very friable, nonsticky, nonplastic; few fine and medium roots; common fine, medium, and coarse tubular pores; very strongly acid; clear smooth boundary.

Bt1—14 to 27 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine and medium subangular blocky structure; very friable, slightly sticky, slightly plastic; few fine and medium roots; common fine, medium, and coarse tubular pores; few faint clay films on all faces of peds and common distinct clay bridges between sand grains; few fine mica flakes; very strongly acid; clear smooth boundary.

Bt2—27 to 38 inches; light olive brown (2.5Y 5/6) fine sandy loam; weak medium and coarse subangular blocky structure; very friable, moderately sticky, moderately plastic; few fine and medium roots; common fine, medium, and coarse tubular pores; few faint clay films on all faces of peds and common distinct clay bridges between sand grains; common medium prominent light gray (10YR 7/1) iron depletions; few fine mica flakes; very strongly acid; clear smooth boundary.

C—38 to 50 inches; light yellowish brown (2.5Y 6/4) loamy sand; single grain; loose; few fine mica flakes; very strongly acid; clear smooth boundary.

Cg1—50 to 61 inches; light gray (10YR 7/1) sand; single grain; loose; common fine mica flakes; strongly acid; clear smooth boundary.

Cg2—61 to 70 inches; light gray (10YR 7/1) sand; single grain; loose; many coarse prominent yellowish brown (10YR 5/6) and light yellowish brown (10YR 6/4) masses of oxidized iron; common fine mica flakes; very strongly acid; clear wavy boundary.



2Cg3—70 to 74 inches; light gray (10YR 7/1) loamy sand; single grain; loose; common medium distinct light yellowish brown (10YR 6/4) masses of oxidized iron; common fine mica flakes; very strongly acid.

### **Range in Characteristics**

*Solum thickness:* 25 to 50 inches or more

*Reaction:* Very strongly acid to moderately acid throughout the profile, except where lime has been applied

*Rock fragments:* 0 to 5 percent gravel throughout the profile

*A horizon (where present):*

Hue—10YR or 2.5Y

Value—3 or 4

Chroma—1 to 4

Texture—loamy sand, loamy fine sand, sandy loam, fine sandy loam, or loam

*Ap horizon:*

Hue—10YR or 2.5Y

Value—3 to 5

Chroma—1 to 4

Texture—loamy sand, loamy fine sand, sandy loam, fine sandy loam, or loam

*E horizon:*

Hue—10YR to 5Y

Value—5 to 7

Chroma—2 to 6

Texture—loamy sand, loamy fine sand, sandy loam, fine sandy loam, or loam

*BA or BE horizon (where present):*

Hue—10YR to 5Y

Value—5 or 6

Chroma—3 to 6

Texture—sandy loam, fine sandy loam, or loam

*Bt horizon:*

Hue—7.5YR to 2.5Y

Value—3 to 6

Chroma—4 to 8

Texture—sandy loam, fine sandy loam, or loam

Redoximorphic features—iron depletions in shades of olive and gray in the lower part of the horizon and masses of oxidized iron in shades of brown, yellow, and red

*C horizon:*

Hue—7.5YR to 5Y

Value—5 to 7

Chroma—3 to 8

Texture—sand, fine sand, loamy sand, loamy fine sand, sandy loam, or fine sandy loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Cg horizon:*

Hue—7.5YR to 5Y or neutral with value of 5 to 7

Value—5 to 7

Chroma—1 or 2

Texture—sand, fine sand, loamy sand, loamy fine sand, sandy loam, or fine sandy loam



Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

## Nevarc Series

*Physiographic province:* Coastal Plain

*Landform:* Marine terraces

*Parent material:* Clayey and loamy marine sediments

*Drainage class:* Moderately well drained

*Slowest saturated hydraulic conductivity:* Moderately low

*Slope range:* 6 to 50 percent

### Associated Soils

- Craven soils, which are on the less steep slopes
- Slagle soils, which have less clay in the subsoil than the Nevarc soils
- Uchee soils, which have a thick sandy surface layer and are better drained than the Nevarc soils
- Tomotley soils, which have less clay than the Nevarc soils and are poorly drained

### Taxonomic Classification

Fine, mixed, subactive, thermic Aquic Hapludults

### Typical Pedon

Nevarc sandy loam in an area of Nevarc-Uchee complex, 15 to 50 percent slopes; located in an area of woodland, 2.9 miles southeast of the junction of Highways VA-623 and VA-621, about 150 yards northwest of the north boat landing in the Chickahominy Wildlife Management Area; Brandon, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 18 minutes 57.00 seconds N. and long. 76 degrees 53 minutes 14.00 seconds W.

A—0 to 5 inches; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many fine, common medium, and few coarse roots; common fine and medium tubular pores; extremely acid; abrupt smooth boundary.

E—5 to 11 inches; pale brown (10YR 6/3) loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; common fine and medium and few coarse roots; common fine and medium tubular pores; extremely acid; abrupt smooth boundary.

Bt1—11 to 26 inches; yellowish brown (10YR 5/4) clay; strong fine and medium subangular blocky and strong fine and medium angular blocky structure; firm, moderately sticky, moderately plastic; common fine and medium and few coarse roots; common fine tubular pores; many distinct clay films on all faces of peds; extremely acid; gradual smooth boundary.

Bt2—26 to 42 inches; yellowish brown (10YR 5/4) clay; moderate medium subangular blocky structure; firm, moderately sticky, moderately plastic; common fine and medium roots; common fine and medium tubular pores; common distinct clay films on all faces of peds; common medium distinct grayish brown (10YR 5/2) iron depletions; common medium prominent yellowish red (5YR 5/8) and strong brown (7.5YR 5/8) masses of oxidized iron; very strongly acid; gradual smooth boundary.

BC—42 to 54 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, moderately sticky, moderately plastic; few fine roots; common fine and medium tubular pores; common distinct clay films on all faces of peds; common medium distinct grayish brown (10YR 5/2) iron depletions;



common medium prominent yellowish red (5YR 5/8) and strong brown (7.5YR 5/8) masses of oxidized iron; extremely acid; gradual smooth boundary.  
C—54 to 72 inches; yellowish brown (10YR 5/6) fine sandy loam; massive; friable, slightly sticky, slightly plastic; few fine tubular pores; very strongly acid.

### **Range in Characteristics**

*Solum thickness:* 30 to 60 inches or more

*Reaction:* Extremely acid to moderately acid throughout the profile

*Rock fragments:* 0 to 2 percent gravel throughout the profile

*A horizon:*

Hue—7.5YR to 2.5Y

Value—2 to 5

Chroma—2 to 4

Texture—sandy loam, fine sandy loam, very fine sandy loam, loam, or silt loam

*E horizon:*

Hue—10YR or 2.5Y

Value—5 to 7

Chroma—3 to 8

Texture—sandy loam, fine sandy loam, very fine sandy loam, loam, or silt loam

*Bt horizon (upper part):*

Hue—7.5YR or 10YR

Value—4 to 7

Chroma—4 to 8

Texture—sandy clay loam, clay loam, silty clay loam, sandy clay, clay, or silty clay

Redoximorphic features—masses of oxidized iron in shades of brown, yellow, and red

*Bt horizon (lower part):*

Hue—5YR to 2.5Y

Value—4 to 7

Chroma—3 to 8

Texture—sandy clay loam, clay loam, silty clay loam, sandy clay, clay, or silty clay

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*BC horizon:*

Hue—5YR to 2.5Y

Value—4 to 7

Chroma—3 to 8

Texture—sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, or clay

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*C horizon:*

Hue—5YR to 2.5Y

Value—4 to 7

Chroma—3 to 8

Texture—sand, loamy sand, sandy loam, or fine sandy loam; stratified or pockets of contrasting textures ranging from sand to clay in some pedons

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Cg horizon (where present):*

Hue—5YR to 2.5Y

Value—4 to 7



Chroma—1 or 2

Texture—sand, loamy sand, sandy loam, or fine sandy loam; stratified or pockets of contrasting textures ranging from sand to clay in some pedons

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

## **Newflat Series**

*Physiographic province:* Coastal Plain

*Landform:* Stream terraces

*Parent material:* Clayey alluvial sediments

*Drainage class:* Somewhat poorly drained

*Slowest saturated hydraulic conductivity:* Low

*Slope range:* 0 to 2 percent

### **Associated Soils**

- Chickahominy soils, which are poorly drained
- Dogue soils, which are moderately well drained and have less silt in the subsoil than the Newflat soil
- Peawick soils, which are moderately well drained
- Altavista and State soils, which have less clay than the Newflat soils and are better drained

### **Taxonomic Classification**

Fine, mixed, subactive, thermic Aeric Endoaquults

### **Typical Pedon**

Newflat silt loam in an area of Newflat-Urban land complex, 0 to 2 percent slopes; located in an area of woodland, 0.7 mile east-southeast of the junction of Highways VA-621 and VA-623 on Highway VA-621, about 0.9 mile southeast of the junction of Highways VA-623 and VA-627, about 1.8 miles southwest of the mouth of Parsons Creek; Brandon, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 20 minutes 26.00 seconds N. and long. 76 degrees 54 minutes 57.00 seconds W.

A—0 to 2 inches; gray (10YR 5/1) silt loam; weak fine and medium granular structure; friable, slightly sticky, slightly plastic; many fine, medium, and coarse roots; very strongly acid; clear smooth boundary.

E—2 to 6 inches; pale brown (10YR 6/3) silt loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; many fine, medium, and coarse roots; common medium distinct gray (10YR 6/1) iron depletions; very strongly acid; clear smooth boundary.

Bt—6 to 14 inches; brown (10YR 5/3) silty clay; strong fine angular blocky structure; firm, moderately sticky, moderately plastic; many fine and medium and few coarse roots; common distinct clay films on all faces of peds; common medium faint grayish brown (10YR 5/2) iron depletions; few fine mica flakes; very strongly acid; clear smooth boundary.

Btg1—14 to 24 inches; gray (5Y 6/1) silty clay; massive; firm, moderately sticky, moderately plastic; common fine and medium roots; common medium prominent strong brown (7.5YR 5/6) masses of oxidized iron; few fine mica flakes; very strongly acid; gradual smooth boundary.

Btg2—24 to 55 inches; gray (5Y 5/1) silty clay; massive; firm, very sticky, very plastic; common medium prominent strong brown (7.5YR 4/6) masses of oxidized iron; very strongly acid; clear smooth boundary.



BCg—55 to 64 inches; gray (5Y 5/1) clay loam; massive; firm, very sticky, very plastic; common medium prominent strong brown (7.5YR 4/6) masses of oxidized iron; very strongly acid.

### Range in Characteristics

*Solum thickness:* 60 to 90 inches or more

*Reaction:* Extremely acid to strongly acid throughout the profile, except where lime has been applied

*A horizon:*

Hue—10YR or 2.5Y or neutral with value of 3 to 5

Value—3 to 5

Chroma—1 or 2

Texture—very fine sandy loam, loam, or silt loam

*Ap horizon (where present):*

Hue—10YR or 2.5Y or neutral with value of 3 to 5

Value—3 to 5

Chroma—1 or 2

Texture—very fine sandy loam, loam, or silt loam

*E horizon:*

Hue—10YR or 2.5Y

Value—5 to 7

Chroma—2 to 4

Texture—very fine sandy loam, loam, or silt loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Bt horizon:*

Hue—10YR to 5Y

Value—5 or 6

Chroma—3 to 6

Texture—clay loam, silty clay loam, clay, or silty clay

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Btg horizon:*

Hue—10YR to 5Y

Value—4 to 7

Chroma—1 or 2

Texture—clay loam, silty clay loam, clay, or silty clay

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*BCg horizon:*

Hue—10YR to 5Y or neutral with value of 4 to 7

Value—4 to 7

Chroma—1 or 2

Texture—loam, silt loam, sandy clay loam, clay loam, or clay

Redoximorphic features—masses of oxidized iron in shades of brown, yellow, and red

*Cg horizon (where present):*

Hue—10YR to 5Y or neutral with value of 4 to 7

Value—4 to 7

Chroma—1 or 2

Texture—fine sandy loam to clay



Redoximorphic features—masses of oxidized iron in shades of brown, yellow, and red

## Nimmo Series

*Physiographic province:* Coastal Plain

*Landform:* Marine terraces

*Parent material:* Loamy and sandy alluvial sediments

*Drainage class:* Poorly drained

*Slowest saturated hydraulic conductivity:* Moderately high

*Slope range:* 0 to 2 percent

### Associated Soils

- Altavista soils, which are moderately well drained and have more clay in the subsoil than the Nimmo soils
- Dragston soils, which are somewhat poorly drained
- Tomotley soils, which have more clay in the subsoil than the Nimmo soils
- Seabrook soils, which have less clay than the Nimmo soils and are better drained

### Taxonomic Classification

Coarse-loamy, mixed, semiactive, thermic Typic Endoaquults

### Typical Pedon

Nimmo fine sandy loam in an area of Nimmo-Urban land complex, 0 to 2 percent slopes; located in an area of woodland, 30 yards south of the junction of Highways VA-600 and VA-106, about 225 yards south-southwest of the C&O Railroad; Roxbury, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 27 minutes 43.00 seconds N. and long. 77 degrees 8 minutes 32.00 seconds W.

A—0 to 4 inches; black (5Y 2/1) fine sandy loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many fine roots; common fine and medium and few coarse tubular pores; very strongly acid; clear smooth boundary.

E1—4 to 10 inches; dark gray (5Y 4/1) sandy loam; weak fine granular structure; very friable, slightly sticky, slightly plastic; common fine roots; common fine, medium, and coarse tubular pores; common fine prominent yellowish brown (10YR 5/8) masses of oxidized iron; very strongly acid; clear smooth boundary.

E2—10 to 14 inches; dark gray (10YR 4/1) sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; few fine, medium, and coarse roots; common fine, medium, and coarse tubular pores; very strongly acid; clear smooth boundary.

Btg—14 to 32 inches; gray (10YR 5/1) fine sandy loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few fine black mineral grains; few feldspar grains; common fine, medium, and coarse tubular pores; few faint clay films on all faces of peds and few faint clay bridges between sand grains; very strongly acid; gradual smooth boundary.

Cg1—32 to 40 inches; gray (10YR 6/1) sand; single grain; loose; discontinuous layers of sandy clay loam; common fine prominent yellowish brown (10YR 5/8) masses of oxidized iron; very strongly acid; clear smooth boundary.

Cg2—40 to 48 inches; gray (10YR 6/1) coarse sand; single grain; loose; few fine black mineral grains; 2 percent rounded quartz gravel; very strongly acid; clear smooth boundary.

Cg3—48 to 64 inches; gray (10YR 5/1) coarse sand; single grain; loose; strongly acid.



### Range in Characteristics

*Solum thickness:* 25 to 45 inches

*Reaction:* Extremely acid to strongly acid throughout the profile, except where lime has been applied

*Rock fragments:* 0 to 3 percent in the A, E, and B horizons; 0 to 20 percent in the C horizons

*A or Ap horizon:*

Hue—10YR to 5Y

Value—2 to 5

Chroma—1 or 2

Texture—loamy sand, loamy fine sand, sandy loam, or fine sandy loam

*E horizon:*

Hue—10YR to 5Y

Value—4 to 7

Chroma—1 or 2

Texture—loamy sand, loamy fine sand, sandy loam, or fine sandy loam

Redoximorphic features—iron depletions in shades of olive and gray

*Btg horizon:*

Hue—10YR to 5Y or neutral with value of 4 to 7

Value—4 to 7

Chroma—1 or 2; dominantly 1

Texture—sandy loam, fine sandy loam, or loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Cg horizon:*

Hue—7.5YR to 2.5Y or neutral with value of 3 to 8

Value—3 to 8

Chroma—1 or 2

Texture (fine-earth fraction)—coarse sand, sand, fine sand, loamy sand, or loamy fine sand; strata of finer textures in some pedons

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

## Peawick Series

*Physiographic province:* Coastal Plain

*Landform:* Stream terraces

*Parent material:* Clayey alluvial sediments

*Drainage class:* Moderately well drained

*Slowest saturated hydraulic conductivity:* Low

*Slope range:* 0 to 3 percent

### Associated Soils

- Chickahominy soils, which are poorly drained
- Dogue soils, which have less silt in the subsoil than the Peawick soils
- Newflat soils, which are somewhat poorly drained
- Tomotley soils, which have less clay than the Peawick soils and are poorly drained

### Taxonomic Classification

Fine, mixed, active, thermic Aquic Paleudults



### Typical Pedon

Peawick silt loam in an area of Peawick-Urban land complex, 0 to 3 percent slopes; located in an area of woodland, 1.2 miles south of the junction of Highways VA-5 and VA-623 on Highway VA-623, about 1.1 miles northeast of the junction of Highway VA-613 and VA-623, about 0.3 mile southwest of Highway VA-623 and Tomahund Creek; Brandon, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 16 minutes 32.00 seconds N. and long. 76 degrees 55 minutes 47.00 seconds W.

- A—0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam; moderate fine and medium granular structure; friable, moderately sticky, moderately plastic; many fine and medium and few coarse roots; extremely acid; abrupt smooth boundary.
- E—2 to 5 inches; light yellowish brown (10YR 6/4) silt loam; moderate medium granular structure; friable, moderately sticky, moderately plastic; many fine and medium and few coarse roots; extremely acid; clear smooth boundary.
- Bt1—5 to 24 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine and medium angular blocky and moderate fine and medium subangular blocky structure; firm, moderately sticky, moderately plastic; common fine and medium roots; common fine tubular pores; common distinct clay films on all faces of peds; common fine prominent strong brown (7.5YR 5/8) masses of oxidized iron; common fine mica flakes; extremely acid; clear smooth boundary.
- Bt2—24 to 36 inches; yellowish brown (10YR 5/8) silty clay; strong fine and medium subangular and angular blocky structure; firm, moderately sticky, moderately plastic; few fine roots; many distinct clay films on all faces of peds; common fine prominent gray (10YR 6/1) iron depletions; common fine distinct strong brown (7.5YR 5/8) masses of oxidized iron; common fine mica flakes; extremely acid; clear smooth boundary.
- Btg1—36 to 58 inches; gray (10YR 6/1) clay; strong medium and coarse angular blocky structure; firm, moderately sticky, moderately plastic; few fine roots; many prominent clay films on all faces of peds; many coarse prominent yellowish brown (10YR 5/8) masses of oxidized iron; common fine mica flakes; extremely acid; gradual smooth boundary.
- Btg2—58 to 64 inches; gray (10YR 6/1) clay; weak medium prismatic structure parting to strong medium and coarse angular blocky; very firm, very sticky, very plastic; few fine roots; many prominent clay films on all faces of peds; common medium prominent yellowish brown (10YR 5/6) masses of oxidized iron; few fine mica flakes; extremely acid.

### Range in Characteristics

*Solum thickness:* 60 inches or more

*Reaction:* Extremely acid to strongly acid throughout the profile, except where lime has been applied

*Rock fragments:* 0 to 2 percent gravel throughout the profile

*Mica flakes:* None to common throughout the profile

*A horizon:*

Hue—10YR to 5Y

Value—2 to 4

Chroma—1 to 3

Texture—loam or silt loam

*Ap horizon (where present):*

Hue—10YR to 5Y

Value—2 to 6

Chroma—1 to 4

Texture—loam or silt loam



*E horizon:*

Hue—10YR to 5Y  
Value—5 to 7  
Chroma—2 to 4  
Texture—loam or silt loam

*Bt horizon (upper part):*

Hue—7.5YR to 2.5Y  
Value—4 to 6  
Chroma—4 to 8  
Texture—clay loam, silty clay loam, clay, or silty clay  
Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Bt horizon (lower part):*

Hue—10YR to 5Y  
Value—5 to 7  
Chroma—3 to 8  
Texture—clay loam, silty clay loam, clay, or silty clay  
Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Btg horizon:*

Hue—10YR to 5Y or neutral with value of 5 to 7  
Value—5 to 7  
Chroma—1 or 2  
Texture—clay loam, silty clay loam, silty clay, or clay  
Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*BCg horizon (where present):*

Hue—10YR to 5Y or neutral with value of 5 to 7  
Value—5 to 7  
Chroma—1 or 2  
Texture—loam, silt loam, clay loam, silty clay loam, silty clay, or clay  
Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Cg horizon (where present):*

Hue—10YR to 5Y or neutral with value of 4 to 7  
Value—4 to 7  
Chroma—1 or 2  
Texture—fine sandy loam to clay  
Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Note:* The soils mapped as Peawick in the survey area are taxadjuncts to the series because they do not have a clay decrease within a depth of 60 inches as established for the series. This difference, however, does not affect the use and management of the soil.

## **Seabrook Series**

*Physiographic province:* Coastal Plain

*Landform:* Marine terraces

*Parent material:* Sandy alluvial sediments

*Drainage class:* Moderately well drained



*Slowest saturated hydraulic conductivity:* High

*Slope range:* 0 to 2 percent

### **Associated Soils**

- Dragston soils, which are somewhat poorly drained and have more clay in the subsoil than the Seabrook soils
- Munden soils, which are moderately well drained and have more clay in the subsoil than the Seabrook soils
- Tomotley soils, which are poorly drained and have more clay in the subsoil than the Seabrook soils

### **Taxonomic Classification**

Mixed, thermic Aquic Udipsamments

### **Typical Pedon**

Seabrook loamy fine sand in an area of Seabrook-Urban land complex, 0 to 2 percent slopes; located in a cultivated area, 0.3 mile east-northeast of the junction of Highways VA-600 and VA-622, about 0.4 mile west-northwest of where Highway VA-600 crosses the C&O Railroad, 175 yards south of the railroad, along a farm lane; Roxbury, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 28 minutes 6.00 seconds N. and long. 77 degrees 9 minutes 14.00 seconds W.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak fine granular structure; very friable; common fine and medium roots; many fine tubular pores; moderately acid; gradual smooth boundary.

C1—9 to 20 inches; light yellowish brown (10YR 6/4) loamy sand; single grain; loose; common fine and medium roots; many fine tubular pores; moderately acid; clear smooth boundary.

C2—20 to 26 inches; yellowish brown (10YR 5/4) loamy sand; single grain; loose; common medium roots; common fine tubular pores; very strongly acid; clear smooth boundary.

C3—26 to 40 inches; yellowish brown (10YR 5/4) loamy sand; single grain; loose; few fine and medium roots; few fine tubular pores; common medium prominent light gray (10YR 7/2) iron depletions; common medium prominent strong brown (7.5YR 5/6) masses of oxidized iron; few fine mica flakes; very strongly acid; clear smooth boundary.

C4—40 to 53 inches; yellowish brown (10YR 5/4) loamy sand; single grain; loose; many medium prominent light gray (10YR 7/2) iron depletions; few fine mica flakes; very strongly acid; clear wavy boundary.

Cg—53 to 60 inches; light gray (10YR 7/1) loamy sand; single grain; loose; common coarse prominent yellowish brown (10YR 5/4) masses of oxidized iron; few fine mica flakes; 5 percent rounded quartz gravel; very strongly acid; clear wavy boundary.

C5—60 to 80 inches; strong brown (7.5YR 5/8) gravelly sand; single grain; loose; many coarse distinct reddish brown (5YR 4/4) masses of oxidized iron; few fine mica flakes; 25 percent rounded quartz gravel; strongly acid.

### **Range in Characteristics**

*Sandy horizon thickness:* 72 inches or more

*Reaction:* Extremely acid to slightly acid throughout the profile, except where lime has been applied

*Rock fragments:* 0 to 35 percent gravel below a depth of 40 inches

*Concretions:* Less than 10 percent concretions and loamy bodies, as much as 2 inches in diameter, in any one horizon in some pedons



*A horizon (where present):*

Hue—10YR or 2.5Y

Value—3 to 5

Chroma—2 to 4

Texture—fine sand, loamy sand, or loamy fine sand

*Ap horizon:*

Hue—10YR or 2.5Y

Value—3 to 5

Chroma—2 or 3

Texture—fine sand, loamy sand, or loamy fine sand

*C horizon (upper part):*

Hue—10YR or 2.5Y

Value—4 to 7

Chroma—3 to 8

Texture—sand, fine sand, loamy coarse sand, loamy sand, or loamy fine sand

Redoximorphic features—iron depletions in shades of gray, olive, and brown and masses of oxidized iron in shades of yellow, brown, and red

*C horizon (lower part):*

Hue—10YR to 5Y

Value—5 to 7

Chroma—3 or 4

Texture (fine-earth fraction)—sand, fine sand, loamy coarse sand, loamy sand, or loamy fine sand

Redoximorphic features—iron depletions in shades of gray, olive, and brown and masses of oxidized iron in shades of yellow, brown, and red

*Cg horizon:*

Hue—10YR to 5Y

Value—5 to 7

Chroma—1 or 2

Texture (fine-earth fraction)—sand, fine sand, loamy coarse sand, loamy sand, or loamy fine sand

Redoximorphic features—iron depletions in shades of gray, olive, and brown and masses of oxidized iron in shades of yellow, brown, and red

## **Slagle Series**

*Physiographic province:* Coastal Plain

*Landform:* Marine terraces

*Parent material:* Loamy marine sediments

*Drainage class:* Moderately well drained

*Slowest saturated hydraulic conductivity:* Moderately low

*Slope range:* 0 to 6 percent

### **Associated Soils**

- Bethera soils, which are poorly drained and have more clay in the subsoil than the Slagle soils
- Craven soils, which have more clay in the subsoil than the Slagle soils
- Nevarc soils, which have more clay in the subsoil than the Slagle soils
- Uchee soils, which have a thick, sandy surface layer and are better drained than the Slagle soils



### Taxonomic Classification

Fine-loamy, siliceous, subactive, thermic Aquic Hapludults

### Typical Pedon

Slagle fine sandy loam in an area of Slagle-Urban land complex, 0 to 2 percent slopes; located in a cultivated area, 0.4 mile north of the junction of Highways VA-604 and VA-605, about 1.4 miles northwest of the junction of Highway VA-659 and Virginia Division of Forestry fire trail 1557, about 70 yards south of a 90-degree curve to the west on Highway VA-604; Roxbury, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 24 minutes 44.00 seconds N. and long. 77 degrees 11 minutes 21.00 seconds W.

- Ap—0 to 10 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; friable, slightly sticky, nonplastic; common fine roots; common fine and medium tubular pores; strongly acid; abrupt smooth boundary.
- Bt1—10 to 25 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, moderately sticky, moderately plastic; few fine roots; common fine and medium tubular pores; few distinct clay films on all faces of peds and few distinct clay bridges between sand grains; common medium distinct strong brown (7.5YR 5/6) and pale brown (10YR 6/3) masses of oxidized iron; strongly acid; gradual smooth boundary.
- Bt2—25 to 44 inches; yellowish brown (10YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable, moderately sticky, moderately plastic; few fine roots; few fine and medium tubular pores; many distinct clay bridges between sand grains and many distinct clay films on all faces of peds; many medium and coarse distinct strong brown (7.5YR 5/6) masses of oxidized iron; many medium and coarse distinct grayish brown (10YR 5/2) iron depletions; very strongly acid; gradual smooth boundary.
- Bt3—44 to 63 inches; yellowish brown (10YR 5/8) sandy clay loam; weak medium and coarse subangular blocky and weak fine angular blocky structure; firm, moderately sticky, moderately plastic; few fine roots; few fine and medium tubular pores; common distinct clay bridges between sand grains and common distinct clay films on all faces of peds; many medium and coarse distinct light brownish gray (10YR 6/2) and gray (10YR 6/1) iron depletions; many medium and coarse distinct yellowish red (5YR 5/8) masses of oxidized iron; very strongly acid.

### Range in Characteristics

*Solum thickness:* 40 to 60 inches or more

*Reaction:* Extremely acid to strongly acid throughout the profile, except where lime has been applied

*Rock fragments:* 0 to 5 percent gravel throughout the profile

*A or Ap horizon:*

Hue—10YR or 2.5Y

Value—2 to 6

Chroma—1 to 4

Texture—sandy loam, fine sandy loam, or loam

*E horizon:*

Hue—10YR or 2.5Y

Value—5 to 7

Chroma—3 or 4

Texture—sandy loam, fine sandy loam, or loam

*BE horizon (where present):*

Hue—7.5YR to 2.5Y



## Soil Survey of Tidewater Cities Area, Virginia

Value—5 or 6  
Chroma—3 to 6  
Texture—sandy loam, fine sandy loam, or loam

### *Bt horizon (upper part):*

Hue—7.5YR to 2.5Y  
Value—5 or 6  
Chroma—3 to 6  
Texture—fine sandy loam, loam, sandy clay loam, or clay loam  
Redoximorphic features—masses of oxidized iron in shades of brown, yellow, and red

### *Bt horizon (lower part):*

Hue—7.5YR to 5Y  
Value—4 to 7  
Chroma—3 to 8  
Texture—fine sandy loam, loam, sandy clay loam, or clay loam  
Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

### *Btg horizon (where present):*

Hue—7.5YR to 5Y  
Value—4 to 7  
Chroma—1 or 2  
Texture—loam, sandy clay loam, or clay loam  
Redoximorphic features—masses of oxidized iron in shades of brown, yellow, and red

### *BC or BCg horizon (where present):*

Hue—7.5YR to 5Y  
Value—4 to 7  
Chroma—1 to 8  
Texture—sandy loam, fine sandy loam, sandy clay loam, clay loam, sandy clay, or clay  
Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

### *Cg horizon (where present):*

Hue—7.5YR to 5Y  
Value—4 to 7  
Chroma—1 or 2  
Texture—loamy sand to clay  
Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

## State Series

*Physiographic province:* Coastal Plain

*Landform:* Marine terraces

*Parent material:* Loamy and sandy sediments

*Drainage class:* Well drained

*Slowest saturated hydraulic conductivity:* Moderately high

*Slope range:* 0 to 3 percent

## Associated Soils

- Bojac soils, which have less clay in the subsoil than the State soils



- Altavista soils, which are moderately well drained
- Munden soils, which are moderately well drained and have less clay in the subsoil than the State soils
- Augusta soils, which are somewhat poorly drained
- Nimmo soils, which are poorly drained and have less clay in the subsoil than the State soils
- Bethera and Chickahominy soils, which have more clay than the State soils and are poorly drained
- Newflat soils, which have more clay than the State soils and are somewhat poorly drained

### **Taxonomic Classification**

Fine-loamy, mixed, semiactive, thermic Typic Hapludults

### **Typical Pedon**

State fine sandy loam in an area of State-Urban land complex, 0 to 3 percent slopes; located 0.8 mile southwest of the junction of Highways VA-35 and VA-647 at Sebrell, 1.3 miles south-southwest of the junction of Highways VA-653 and VA-719, about 1.6 miles northeast of the junction of Highway VA-653 and the Nottoway River, in cropland; Sebrell, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 36 degrees 46 minutes 43.00 seconds N. and long. 77 degrees 8 minutes 19.00 seconds W.

- Ap—0 to 10 inches; brown (10YR 5/3) fine sandy loam; weak fine and medium granular structure; friable, nonsticky, nonplastic; many fine and medium roots; many fine and medium high-continuity interstitial and tubular pores; few fine mica flakes; neutral; abrupt smooth boundary.
- Bt1—10 to 14 inches; yellowish brown (10YR 5/6) sandy clay loam; moderate medium and coarse subangular blocky structure; friable, slightly sticky, slightly plastic; many fine and medium roots; many fine and medium high-continuity interstitial and tubular pores; common distinct strong brown (7.5YR 4/6) clay films on all faces of peds; few fine mica flakes; moderately acid; clear wavy boundary.
- Bt2—14 to 40 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium and coarse subangular blocky structure; friable, slightly sticky, slightly plastic; few very fine roots; many fine and medium moderate-continuity interstitial pores; common distinct clay films on all faces of peds; common fine mica flakes; strongly acid; gradual wavy boundary.
- Bt3—40 to 50 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few very fine roots between peds; few fine and medium high-continuity tubular pores; common distinct clay films on all faces of peds; common fine faint reddish yellow (7.5YR 6/8) masses of oxidized iron; common fine mica flakes; very strongly acid; clear wavy boundary.
- BC—50 to 56 inches; yellowish brown (10YR 5/6) and brownish yellow (10YR 6/8) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine and medium moderate-continuity interstitial pores; few distinct clay films on all faces of peds; common fine mica flakes; strongly acid; gradual wavy boundary.
- C1—56 to 64 inches; yellowish brown (10YR 5/6) and brownish yellow (10YR 6/8) sandy loam; massive; friable, nonsticky, nonplastic; common fine moderate-continuity interstitial pores; common fine mica flakes; strongly acid; clear wavy boundary.
- C2—64 to 84 inches; yellow (2.5Y 7/6) sand; single grain; loose, nonsticky, nonplastic; slightly acid.



### Range in Characteristics

*Solum thickness:* 30 to 60 inches or more

*Soil reaction:* Extremely acid to strongly acid in the A, E, BA, BE, and Bt horizons;  
extremely acid to slightly acid in the BC and C horizons

*Rock fragments:* 0 to 2 percent quartz gravel in the A, E, BA, BE, Bt, and BC horizons;  
0 to 25 percent quartz gravel in the C horizon

*Mica flakes:* None to common

*A or Ap horizon:*

Hue—10YR or 2.5Y

Value—3 to 6

Chroma—2 to 6

Texture—loamy sand, sandy loam, fine sandy loam, or loam

*E horizon (where present):*

Hue—10YR or 2.5Y

Value—5 to 7

Chroma—3 to 6

Texture—loamy sand, sandy loam, fine sandy loam, or loam

*BA or BE horizon (where present):*

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—4 to 8

Texture—sandy loam or fine sandy loam

*Bt horizon:*

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—4 to 8

Texture—loam, sandy loam, sandy clay loam, or clay loam

Redoximorphic features—iron depletions in shades of brown, olive, and gray in the lower part of the horizon and masses of oxidized iron in shades of brown, yellow, and red

*BC horizon:*

Hue—7.5YR to 2.5Y

Value—4 to 6

Chroma—4 to 8

Texture—sandy loam, fine sandy loam, loam, or sandy clay loam

Redoximorphic features—iron depletions in shades of brown, olive, and gray and masses of oxidized iron in shades of brown, yellow, and red

*C horizon:*

Hue—7.5YR to 2.5Y

Value—4 to 7

Chroma—2 to 8

Texture (fine-earth fraction)—sand, loamy sand, or sandy loam

Redoximorphic features—iron depletions in shades of brown, olive, and gray and masses of oxidized iron in shades of brown, yellow, and red

## Suffolk Series

*Physiographic province:* Coastal Plain

*Landform:* Marine terraces

*Parent material:* Loamy and sandy marine sediments



*Drainage class:* Well drained

*Slowest saturated hydraulic conductivity:* Moderately high

*Slope range:* 2 to 6 percent

### **Associated Soils**

- Slagle soils, which are moderately well drained
- Nevarc soils, which are moderately well drained and have more clay in the subsoil than the Suffolk soils
- Uchee soils, which have a thick, sandy surface layer

### **Taxonomic Classification**

Fine-loamy, siliceous, semiactive, thermic Typic Hapludults

### **Typical Pedon**

Suffolk fine sandy loam, 2 to 6 percent slopes; located in a grassed area, 150 yards south of the football field at King William High School; Manquin, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 44 minutes 19.00 seconds N. and long. 77 degrees 7 minutes 58.00 seconds W.

Ap—0 to 10 inches; brown (10YR 5/3) fine sandy loam; weak medium granular structure; friable, nonsticky, nonplastic; common fine roots; many fine tubular pores; strongly acid; gradual smooth boundary.

BA—10 to 14 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; friable, nonsticky, nonplastic; common fine roots; many fine tubular pores; strongly acid; gradual smooth boundary.

Bt1—14 to 22 inches; strong brown (7.5YR 5/6) sandy loam; weak medium subangular blocky structure; friable, slightly sticky, nonplastic; common fine and medium roots; common fine and medium tubular pores; few faint clay films on all faces of peds; extremely acid; gradual smooth boundary.

Bt2—22 to 38 inches; strong brown (7.5YR 5/6) sandy loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; common fine tubular pores; few faint clay films on all faces of peds; very strongly acid; gradual smooth boundary.

BC—38 to 43 inches; strong brown (7.5YR 5/8) loamy sand; weak medium subangular blocky structure; friable, nonsticky, nonplastic; common fine roots; common distinct clay bridges between sand grains; very strongly acid; gradual irregular boundary.

C—43 to 65 inches; yellow (10YR 7/8) sand; single grain; loose; few coarse distinct reddish yellow (7.5YR 6/8) masses of oxidized iron; very strongly acid.

### **Range in Characteristics**

*Solum thickness:* 30 to 50 inches

*Soil reaction:* Extremely acid to moderately acid, except where lime has been applied

*Rock fragments:* 0 to 5 percent in the A, E, BA, BE, Bt, and BC horizons; 0 to 30 percent in the C horizon

*A horizon (where present):*

Hue—7.5YR or 10YR

Value—3 to 6

Chroma—1 to 4

Texture—loamy sand, sandy loam, or fine sandy loam

*Ap horizon:*

Hue—7.5YR or 10YR

Value—3 to 6



Chroma—1 to 4

Texture—loamy sand, sandy loam, or fine sandy loam

*E horizon (where present):*

Hue—7.5YR or 10YR

Value—5 to 7

Chroma—3 to 6

Texture—loamy sand, sandy loam, or fine sandy loam

*BA or BE horizon:*

Hue—7.5YR or 10YR

Value—5 to 7

Chroma—3 to 6

Texture—sandy loam, fine sandy loam, or loam

*Bt horizon:*

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—4 to 8

Texture—sandy loam, fine sandy loam, loam, or sandy clay loam

*BC horizon:*

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—4 to 8

Texture—loamy sand, loamy fine sand, sandy loam, or fine sandy loam

*C horizon:*

Hue—7.5YR to 2.5Y

Value—5 to 7

Chroma—2 to 8

Texture (fine-earth fraction)—sand, fine sand, loamy sand, or loamy fine sand

Redoximorphic features—masses of oxidized iron in shades of brown, yellow, and red

## Tomotley Series

*Physiographic province:* Coastal Plain

*Landform:* Marine terraces

*Parent material:* Loamy alluvial sediments

*Drainage class:* Poorly drained

*Slowest saturated hydraulic conductivity:* Moderately high

*Slope range:* 0 to 2 percent

### Associated Soils

- Altavista soils, which are moderately well drained
- Augusta soils, which are somewhat poorly drained
- Dragston soils, which are somewhat poorly drained and have less clay in the subsoil than the Tomotley soils
- Nimmo soils, which have less clay in the subsoil than the Tomotley soils
- Seabrook soils, which are moderately well drained and do not have a subsoil

### Taxonomic Classification

Fine-loamy, mixed, semiactive, thermic Typic Endoaquults



### Typical Pedon

Tomotley fine sandy loam in an area of Tomotley-Urban land complex, 0 to 2 percent slopes; located in an area of woodland, 1.6 miles east of the junction of Highways VA-614 and VA-155, about 0.5 mile northeast of the junction of Highway VA-614 and Virginia Division of Forestry fire trail 1501; Providence Forge, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 37 degrees 24 minutes 26.00 seconds N. and long. 77 degrees 0 minutes 55.00 seconds W.

- A—0 to 4 inches; dark gray (5Y 4/1) fine sandy loam; moderate medium granular structure; very friable, slightly sticky, slightly plastic; many fine and medium and common coarse roots; common fine and medium tubular pores; extremely acid; clear smooth boundary.
- Eg—4 to 8 inches; dark grayish brown (2.5Y 4/2) fine sandy loam; weak fine granular structure; friable, moderately sticky, slightly plastic; common fine and medium and few coarse roots; common fine and medium and few coarse tubular pores; very strongly acid; clear smooth boundary.
- Btg1—8 to 15 inches; gray (5Y 5/1) fine sandy loam; moderate medium subangular blocky structure; friable, moderately sticky, moderately plastic; common fine and few medium roots; common fine and medium tubular pores; common clay bridges between sand grains and many distinct clay films on all faces of peds; common medium prominent yellowish brown (10YR 5/8) masses of oxidized iron; very strongly acid; clear smooth boundary.
- Btg2—15 to 38 inches; dark gray (5Y 4/1) sandy clay loam; moderate medium subangular blocky structure; friable, moderately sticky, moderately plastic; few fine roots; common fine and medium tubular pores; common clay bridges between sand grains and many distinct clay films on all faces of peds; common medium prominent yellowish brown (10YR 5/8) masses of oxidized iron; very strongly acid; clear smooth boundary.
- Btg3—38 to 58 inches; gray (5Y 5/1) sandy clay loam; weak medium subangular blocky structure; friable, moderately sticky, moderately plastic; few fine roots; common medium prominent light olive brown (2.5Y 5/6) masses of oxidized iron; very strongly acid; gradual smooth boundary.
- BCg—58 to 65 inches; gray (N 6/0) fine sandy loam; massive; friable, moderately sticky, slightly plastic; common medium prominent light olive brown (2.5Y 5/6) masses of oxidized iron; very strongly acid; clear smooth boundary.
- Cg—65 to 75 inches; gray (5Y 5/1) loamy sand; single grain; loose; extremely acid.

### Range in Characteristics

*Solum thickness:* 30 to 60 inches or more

*Reaction:* Extremely acid to strongly acid in the upper part of the profile, except where lime has been applied; extremely acid to moderately acid in the lower part of the profile

*Rock fragments:* 0 to 5 percent gravel in the A, E, and B horizons

*Mica flakes:* Few or common in the lower part of the B horizon and in the C horizon in some pedons

*Concretions:* Fine black minerals in the lower part of the B horizon and in the C horizon in some pedons

*A or Ap horizon:*

Hue—10YR to 5Y or neutral with value of 2 to 4

Value—2 to 4

Chroma—1 or 2

Texture—loamy sand, loamy fine sand, fine sandy loam, or loam



*Eg horizon:*

Hue—10YR or 2.5Y

Value—4 to 7

Chroma—1 or 2

Texture—loamy sand, loamy fine sand, fine sandy loam, or loam

Redoximorphic features—masses of oxidized iron in shades of brown, yellow, and red

*Btg horizon:*

Hue—10YR to 5Y or neutral with value of 4 to 7

Value—4 to 7

Chroma—1 or 2

Texture—fine sandy loam, loam, sandy clay loam, or clay loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*BCg horizon:*

Hue—10YR to 5Y or neutral with value of 4 to 7

Value—4 to 7

Chroma—1 or 2

Texture—fine sandy loam, sandy clay loam, or clay loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Cg horizon:*

Hue—10YR to 5BG or neutral with value of 4 to 7

Value—4 to 7

Chroma—1 or 2

Texture—sand to clay; pockets or strata of contrasting textures in some pedons

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

## Uchee Series

*Physiographic province:* Coastal Plain

*Landform:* Marine terraces

*Parent material:* Loamy and sandy marine sediments

*Drainage class:* Well drained

*Slowest saturated hydraulic conductivity:* Moderately high

*Slope range:* 2 to 50 percent

### Associated Soils

- Craven and Nevarc soils, which are moderately well drained, do not have thick, sandy surface layers, and have more clay in the upper subsoil than the Uchee soils
- Slagle soils, which are moderately well drained and do not have thick, sandy surface layers

### Taxonomic Classification

Loamy, kaolinitic, thermic Arenic Kanhapludults

### Typical Pedon

Uchee loamy fine sand, 2 to 6 percent slopes; located in an area of woodland, 1.0 mile west of the junction of Highways VA-618 and VA-602, about 200 yards south of Highway VA-602; Providence Forge, VA, 7.5-minute USGS topographic quadrangle,



## Soil Survey of Tidewater Cities Area, Virginia

NAD27; lat. 37 degrees 24 minutes 15.00 seconds N. and long. 77 degrees 7 minutes 13.00 seconds W.

- A—0 to 4 inches; dark gray (10YR 4/1) loamy sand; weak fine granular structure; very friable, nonsticky, nonplastic; few fine and medium roots; common fine and medium and few coarse tubular pores; very strongly acid; abrupt smooth boundary.
- E—4 to 26 inches; light yellowish brown (10YR 6/4) loamy sand; single grain; very friable, nonsticky, nonplastic; few fine roots; common fine and medium and few coarse tubular pores; very strongly acid; gradual smooth boundary.
- BE—26 to 30 inches; brownish yellow (10YR 6/8) and light yellowish brown (10YR 6/4) sandy loam; weak fine granular structure; friable, slightly sticky, slightly plastic; few fine and medium roots; common fine and medium and few coarse tubular pores; few faint clay films on all faces of peds and common distinct clay bridges between sand grains; very strongly acid; clear smooth boundary.
- Bt—30 to 50 inches; brownish yellow (10YR 6/8) sandy clay loam; weak medium subangular blocky structure; friable, moderately sticky, moderately plastic; few fine roots; few fine and medium tubular pores; common clay films on all faces of peds and many distinct clay bridges between sand grains; very strongly acid; clear smooth boundary.
- C—50 to 62 inches; yellowish brown (10YR 5/8) sandy clay loam; massive; friable, moderately sticky, moderately plastic; few fine roots; compact in place; few fine tubular pores; common medium prominent gray (10YR 6/1) iron depletions; common medium prominent yellowish red (5YR 5/6) and strong brown (7.5YR 5/6) masses of oxidized iron; very strongly acid.

### Range in Characteristics

*Solum thickness:* 40 to 60 inches

*Reaction:* Very strongly acid or strongly acid throughout the profile, except where lime has been applied

*Rock fragments:* 0 to 15 percent gravel throughout the profile

#### *A or Ap horizon:*

Hue—10YR

Value—3 to 6

Chroma—2 to 4

Texture—sand or loamy sand

#### *E horizon:*

Hue—10YR or 2.5Y

Value—4 to 6

Chroma—4 or 6

Texture—sand or loamy sand

#### *EB or BE horizon:*

Hue—7.5YR or 10YR

Value—5 to 7

Chroma—4 to 8

Texture—loamy sand or sandy loam

#### *Bt horizon (upper part):*

Hue—7.5YR or 10YR

Value—5 to 7

Chroma—4 to 8

Texture—sandy loam or sandy clay loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red



*Bt horizon (lower part):*

Hue—7.5YR or 10YR

Value—5 to 7

Chroma—4 to 8

Texture—sandy clay loam, sandy clay, or clay

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*C horizon:*

Hue—2.5YR to 10YR

Value—4 to 7

Chroma—3 to 8

Texture—sandy loam or sandy clay loam; pockets or strata of clayey materials in some pedons

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

## **Yemassee Series**

*Physiographic province:* Coastal Plain

*Landform:* Uplands

*Parent material:* Loamy marine deposits

*Drainage class:* Somewhat poorly drained

*Slowest saturated hydraulic conductivity:* Moderately high

*Slope range:* 0 to 2 percent

### **Associated Soils**

- Altavista soils, which are moderately well drained
- Slagle soils, which are moderately well drained
- Craven and Nevarc soils, which have more clay than the Yemassee soils and are better drained
- Uchee soils, which have a thick, sandy surface layer and are better drained than the Yemassee soils

### **Taxonomic Classification**

Fine-loamy, siliceous, semiactive, thermic Aquic Hapludults

### **Typical Pedon**

Yemassee fine sandy loam in an area of Yemassee-Urban land complex, 0 to 2 percent slopes; located 1.3 miles southeast of the junction of Highway VA-35 and the Sussex County line, 1.1 miles west-northwest of the junction of Highways VA-606 and VA-607, about 0.9 mile east of the south junction of Highways VA-35 and VA-607, in woodland; Vicksville, VA, 7.5-minute USGS topographic quadrangle, NAD27; lat. 36 degrees 50 minutes 25.00 seconds N. and long. 77 degrees 6 minutes 51.00 seconds W.

A—0 to 4 inches; grayish brown (10YR 5/2) fine sandy loam; weak medium granular structure; friable, slightly sticky, slightly plastic; many very fine and fine, common medium, and few coarse roots; common medium moderate-continuity tubular pores; very strongly acid; clear smooth boundary.

E—4 to 15 inches; pale brown (10YR 6/3) fine sandy loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many very fine and fine and few medium and coarse roots; common medium moderate-continuity tubular pores; few medium prominent strong brown (7.5YR 5/8) and common medium distinct



yellowish brown (10YR 5/6) masses of oxidized iron; very strongly acid; clear smooth boundary.

- Btg—15 to 40 inches; light brownish gray (10YR 6/2) sandy clay loam; weak medium subangular blocky structure; friable, moderately sticky, moderately plastic; few very fine and fine roots; common fine and medium high-continuity tubular pores; common distinct continuous clay films on surfaces along root channels and common distinct continuous clay films on all faces of peds; common medium prominent strong brown (7.5YR 5/8) and common medium distinct yellowish brown (10YR 5/6) masses of oxidized iron; very strongly acid; clear smooth boundary.
- BCg—40 to 60 inches; gray (10YR 6/1) sandy loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few very fine and fine roots; common very fine and fine moderate-continuity tubular pores; few faint patchy clay films on all faces of peds; few medium distinct yellowish brown (10YR 5/6), few fine prominent red (10R 4/8), and common medium prominent strong brown (7.5YR 5/8) masses of oxidized iron; very strongly acid.

### **Range in Characteristics**

*Solum thickness:* 40 to 70 inches or more

*Soil reaction:* Extremely acid to slightly acid in the A and E horizons; extremely acid to strongly acid in the Bt, Btg, BCg, and Cg horizons

*A or Ap horizon:*

Hue—10YR or 2.5Y or neutral with value of 2 to 5

Value—2 to 5

Chroma—1 or 2

Texture—loamy sand, loamy fine sand, sandy loam, or fine sandy loam

*E horizon:*

Hue—10YR or 2.5Y

Value—5 to 7

Chroma—2 to 4

Texture—loamy sand, loamy fine sand, sandy loam, or fine sandy loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Bt horizon (where present):*

Hue—10YR or 2.5Y

Value—5 or 6

Chroma—3 to 8

Texture—sandy loam, fine sandy loam, sandy clay loam, or clay loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Btg horizon:*

Hue—7.5YR to 2.5Y or neutral with value of 5 to 7

Value—5 to 7

Chroma—1 or 2

Texture—sandy loam, fine sandy loam, sandy clay loam, or clay loam

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*BCg horizon:*

Hue—10YR or 2.5Y or neutral with value of 5 to 7

Value—5 to 7

Chroma—1 or 2

Texture—sandy loam, sandy clay loam, or clay loam



## Soil Survey of Tidewater Cities Area, Virginia

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Cg horizon (where present):*

Hue—10YR to 5Y or neutral with value of 5 to 7

Value—5 to 7

Chroma—1 or 2

Texture—sand to clay

Redoximorphic features—iron depletions in shades of olive and gray and masses of oxidized iron in shades of brown, yellow, and red

*Note:* The soils mapped as Yemassee in the survey area are taxadjuncts to the series because the colors in the upper part of the pedon are not as bright and are less gray than what is established for the series. These differences, however, do not affect the use and management of the soil.



# Formation of the Soils

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This section describes the factors of soil formation and relates them to the soils in the Tidewater Cities Area. It also explains the major processes of soil horizon development.

## Factors of Soil Formation

Soils are intimate mixtures of broken and partly or completely weathered rock, minerals, organic matter, plants and animals, water, and air. They occur as part of the natural landscape and differ from place to place. They differ in occurrence, in degree of development of various horizons, in mineral content, and in texture, color, and slope. The characteristics of the soils in any given area depend upon the interaction of the five factors of soil formation, which are parent material, climate, living organisms, topography, and time. Topography over time modifies the effect of climate and living organisms on parent material (Jenny, 1941).

## Parent Material

Parent material is the unconsolidated material in which a soil forms. It is largely responsible for the chemical and mineral composition of soils. The two broad classes of parent material in the survey area are fluviomarine and alluvial materials.

Fluviomarine material is transported material that has been reworked by stream and marine action and forms the basis for the soils of the Coastal Plain. It consists of transported and reworked sands, silts, and clays that are gravelly to extremely gravelly in places. The material is layered, and the texture changes abruptly in many places in vertical or horizontal directions. Soil formed from fluviomarine material is commonly strongly acid or very strongly acid and low in bases. The texture of the soil reflects the textures of the layers from which it formed.

Alluvium is material transported by water and deposited as unconsolidated deposits of sand, silt, and clay. It forms the basis for soils on terraces and bottom lands of the Coastal Plain. Alluvial parent material is of local origin along the smaller streams and drainageways and is of both local and general origin along the James River. The material is on flood plains and terraces. The alluvium has a mixed lithology because of the wide variety of igneous and metamorphic rocks and fluviomarine deposits found in the uplands. Total thickness of the alluvium ranges from several feet along the drainageways and small streams to several tens of feet along the James River. Alluvium along the drainageways and small streams is commonly medium to coarse textured. Along the James River, texture varies widely. It ranges from fine textured slack water deposits to coarse textured sand and gravel deposits. The soils that formed in alluvium are moderate in bases and moderately acid or strongly acid.

## Climate

Climate affects the physical, chemical, and biological relationships in soils, primarily through the influence of precipitation and temperature. Water dissolves minerals, supports biological activity, and transports mineral and organic residue through the



solum. Temperature determines the type of physical, chemical, and biological activity that takes place and the rate at which it occurs.

The survey area has a rather humid, temperate climate that is typical of most coastal or near-coastal areas of the Middle Atlantic States. The average annual rainfall is about 44.64 inches, and the average air temperature is between 41 and 77 degrees F. Rainfall is well distributed throughout the year, but normally July and August are the months of highest rainfall.

The climate is fairly uniform throughout the cities, and there are no significant differences in elevation. Thus, there are no obstructions to the movement of winds, clouds, and rainstorms. Masses of air generally move through the survey area from the northwest, but they are warmed by air that moves in periodically from the south and southwest.

Because precipitation exceeds evapotranspiration, this humid, rather uniform climate has caused the soils to be strongly leached. Most of the soluble material that either was originally present or was released through weathering has been removed. Therefore, most of the soils are strongly acid and generally are low in plant nutrients.

Precipitation mainly is responsible for the subsoil that characterizes most soils in the survey area. In addition to leaching soluble material, water that percolates through the soil moves clay from the surface layer to a subsoil layer. Except for soils formed in recent alluvium or sand, soils of the survey area have a subsoil that contains more clay than the surface layer.

Also influenced by climate is the formation of blocky structure in the subsoil of well developed soils. The development of peds (aggregates) in the subsoil is caused by changes in volume of the soil mass. These changes are primarily the result of alternating wet and dry periods and of alternating freezing and thawing periods.

Weathering of minerals is at a rate proportional to temperature and the amount of moisture. Soil weathers more rapidly in tropical regions than in temperate regions and humid regions. In the Tidewater Cities Area, the soils are relatively low in weatherable minerals. They contain no free carbonates and most of the bases have been leached out. However, because many of the soils that formed in transported parent material had previously undergone one or more cycles of erosion, these materials may have been highly weathered and leached at the time they were deposited.

## **Living Organisms**

Plants and animals are the main source of organic matter in soils. Organic matter decomposes and is incorporated into the soil by the action of micro-organisms and earthworms and, to a lesser degree, by windthrown trees and burrowing animals.

Before settlement by humans, the native vegetation was most important in the complex of living organisms that affect soil development. The settlers found a dense forest that consisted mainly of hardwoods. Oaks were dominant in most parts of the area. Yellow-poplar, sweetgum, blackgum, holly, hickory, maple, dogwood, loblolly pine, and Virginia pine were also important, but there were probably few pure stands of pine before the area was settled. The fairly pure stands of pine that exist today generally are in areas that were once cleared and cultivated.

Most hardwoods use large amounts of calcium and other bases if they are available. Soils that are normally high in bases remain so under a cover of deciduous trees because, in large part, these bases are returned to the soil each year. When the leaves fall and decompose, the bases reenter the soil and are again used by plants. The soils in the Tidewater Cities Area, however, have never been very high in bases; consequently, they are acid even under a cover of hardwoods. Soils that are strongly acid and low in fertility are better suited to pines than to most hardwoods. Pines do not require large amounts of calcium and other bases. Their needles do little to restore fertility to the soil.



As agriculture and urban growth developed in the area, humans became important factors in the development of the soils. The clearing of forests, cultivation in some areas, introduction of new kinds of crops and other plants, and improvements in drainage affected development of the soils and will continue to affect their development in the future.

The most important changes brought about by humans include mixing of the upper horizons of the soil to form a plow layer; tilling sloping soils, which resulted in accelerated erosion; and liming and fertilizing to change the content of plant nutrients, especially in the upper horizons.

## **Topography**

Topography, or relief, affects the formation of soils by influencing the rate of infiltration, the rate of surface runoff, soil drainage, geologic erosion, and soil temperature. It can alter the effects of other soil-forming factors to the extent that several different kinds of soil can form from the same parent material. Differences in topography can cause the same parent material to weather at different rates, thus affecting the impact of plants and animals on soil formation.

The Tidewater Cities Area has a rolling topography that is moderately incised by the major drainage patterns. A wide area of river terrace is present along the lower part of the James River. Elevations in the area range from sea level along the James River and Chesapeake Bay to a height of about 85 feet in the western part of the survey area. Generally, the land surface slopes gently to the southeast at an average rate of 20 feet to the mile.

The survey area is drained by a number of short streams that empty into the James River and Chesapeake Bay. The drainage pattern is, in general, dendritic, but it is irregularly branched. The general fluvial cycle is in a stage of late youth or early maturity.

The cities generally consist of gently sloping to steep, intermediate to broad ridges and rises, which have slopes that range from 0 to 15 percent. The gently sloping areas have a medium rate of runoff and a good rate of water infiltration. The steep areas, which have slopes that range from 15 to 50 percent, commonly have rapid rates of runoff and a poor rate of water infiltration. The steeper soils have thinner subsoils than the less sloping soils.

Soils on marine terraces range from well drained to poorly drained and commonly are on slopes ranging from 0 to 6 percent. Drainage is commonly related to both the texture and position of the alluvium on the landscape. Thus, soils developed from fine textured slack water deposits in low positions are often poorly drained. Deposits of fine materials on the gently sloping high river terraces are typically moderately well drained or well drained. Layers of contrasting materials in the alluvium cause fluctuating water tables and often result in moderately well drained or somewhat poorly drained soils.

## **Time**

Time is needed for changes to take place in the parent material. Because of other soil-forming factors, however, soils that formed in the same type of parent material and for the same amount of time may not be equally developed. Runoff and erosion, which hinder the development of well expressed soil horizons, are greater on the steeper slopes. Thus, soils on the steeper slopes generally are less developed than soils on the less steep slopes, even though they formed in the same parent material.

Soils that formed in weather-resistant parent material do not develop as rapidly as soils that formed in parent material that is less resistant to weathering. Soils on flood plains commonly have weakly defined layers because they are subject to the constant deposition of sediment.



## Processes of Soil Horizon Differentiation

Several processes are involved in the formation of soil horizons. Among these are the accumulation of organic matter, the leaching of soluble salts, the reduction and transfer of iron, the formation of soil structure, and the formation and translocation of clay minerals. These processes occur continually and simultaneously. They have been taking place for thousands of years.

Soils that have distinct subsoil horizons were leached of some of the lime and soluble salts before the clay minerals moved downward. Some of the factors that affect this leaching are the kinds of salts originally present, the depth to which the soil solution percolates, and the texture of the soil profile.

In the Tidewater Cities Area, well drained and moderately well drained soils have a red to yellowish brown subsoil. These colors are caused mainly by thin coatings of iron oxide on sand and silt grains, but in some soils the colors are inherited from the materials in which the soils formed. The structure in these soils is weak to strong subangular blocky, and the subsoil contains more clay than the surface layer.

The reduction and transfer of iron, called gleying, is associated mainly with wet, poorly drained soils. Moderately well drained and somewhat poorly drained soils have red, yellowish red, and yellowish brown iron and manganese accumulations and gray iron and manganese depletions. This indicates the segregation of iron or manganese, or both, due to a fluctuating water table. In poorly drained soils, the subsoil and underlying material are gray. This indicates the reduction and transfer of iron or manganese, or both, in solution (Vepraskas, 1992).



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# Glossary

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Many of the terms relating to landforms, geology, and geomorphology are defined in more detail in the “National Soil Survey Handbook” (available in local offices of the Natural Resources Conservation Service or on the Internet).

**Alluvium.** Unconsolidated material, such as gravel, sand, silt, clay, and various mixtures of these, deposited on land by running water.

**Animal unit month (AUM).** The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

**Aquic conditions.** Current soil wetness characterized by saturation, reduction, and redoximorphic features.

**Argillic horizon.** A subsoil horizon characterized by an accumulation of illuvial clay.

**Available water capacity (available moisture capacity).** The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low .....	0 to 3
Low .....	3 to 6
Moderate .....	6 to 9
High .....	9 to 12
Very high .....	more than 12

**Backslope.** The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

**Backswamp.** A flood-plain landform. Extensive, marshy or swampy, depressed areas of flood plains between natural levees and valley sides or terraces.

**Base saturation.** The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

**Bottom land.** An informal term loosely applied to various portions of a flood plain.

**Canopy.** The leafy crown of trees or shrubs. (See Crown.)

**Catena.** A sequence, or “chain,” of soils on a landscape that formed in similar kinds of parent material and under similar climatic conditions but that have different characteristics as a result of differences in relief and drainage.

**Cation.** An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

**Cation-exchange capacity.** The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

**Clay.** As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

**Clay depletions.** See Redoximorphic features.



- Clay film.** A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.
- Climax plant community.** The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.
- Coarse textured soil.** Sand or loamy sand.
- Cobble (or cobblestone).** A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.
- COLE (coefficient of linear extensibility).** See Linear extensibility.
- Colluvium.** Unconsolidated, unsorted earth material being transported or deposited on side slopes and/or at the base of slopes by mass movement (e.g., direct gravitational action) and by local, unconcentrated runoff.
- Complex slope.** Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.
- Complex, soil.** A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.
- Concretions.** See Redoximorphic features.
- Consistence, soil.** Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."
- Control section.** The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.
- Corrosion** (soil survey interpretations). Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.
- Crown.** The upper part of a tree or shrub, including the living branches and their foliage.
- Crusts, soil.** Relatively thin, somewhat continuous layers of the soil surface that often restrict water movement, air entry, and seedling emergence from the soil. They generally are less than 2 inches thick and are massive.
- Cutbanks cave** (in tables). The walls of excavations tend to cave in or slough.
- Depth, soil.** Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.
- Drainage class** (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained*, *somewhat excessively drained*, *well drained*, *moderately well drained*, *somewhat poorly drained*, *poorly drained*, and *very poorly drained*. These classes are defined in the "Soil Survey Manual."
- Drainage, surface.** Runoff, or surface flow of water, from an area.
- Drainageway.** A general term for a course or channel along which water moves in draining an area. A term restricted to relatively small, linear depressions that at some time move concentrated water and either do not have a defined channel or have only a small defined channel.
- Earthy fill.** See Mine spoil.



- Eluviation.** The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.
- Endosaturation.** A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.
- Eolian deposit.** Sand-, silt-, or clay-sized clastic material transported and deposited primarily by wind, commonly in the form of a dune or a sheet of sand or loess.
- Ephemeral stream.** A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.
- Episaturation.** A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.
- Erosion.** The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.  
*Erosion* (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.  
*Erosion* (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.
- Erosion surface.** A land surface shaped by the action of erosion, especially by running water.
- Fertility, soil.** The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.
- Fibric soil material (peat).** The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.
- Field moisture capacity.** The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity*, *normal moisture capacity*, or *capillary capacity*.
- Fill slope.** A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.
- Fine textured soil.** Sandy clay, silty clay, or clay.
- Firebreak.** An area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.
- First bottom.** An obsolete, informal term loosely applied to the lowest flood-plain steps that are subject to regular flooding.
- Flooding frequency class.** Flooding frequency class is the number of times flooding occurs over a period of time and is expressed as a class. The classes of flooding are defined as follows:  
*None.*—There is no reasonable possibility of flooding; there is a near 0 percent chance of flooding in any year or flooding occurs less than 1 time in 500 years.  
*Very rare.*—Flooding is very unlikely but possible under extremely unusual weather conditions; there is a less than 1 percent chance of flooding in any year or flooding occurs less than 1 time in 100 years but at least 1 time in 500 years.  
*Rare.*—Flooding is unlikely but possible under unusual weather conditions; there



is a 1 to 5 percent chance of flooding in any year or flooding occurs nearly 1 to 5 times in 100 years.

*Occasional.*—Flooding is expected infrequently under usual weather conditions; there is a 5 to 50 percent chance of flooding in any year or flooding occurs more than 5 to 50 times in 100 years.

*Frequent.*—Flooding is likely to occur often under usual weather conditions; there is a more than a 50 percent chance of flooding in any year or flooding occurs more than 50 times in 100 years, but there is a less than a 50 percent chance of flooding in all months in any year.

*Very frequent.*—Flooding is likely to occur very often under usual weather conditions; there is a more than a 50 percent chance of flooding in all months of any year.

**Flood plain.** The nearly level plain that borders a stream and is subject to flooding unless protected artificially.

**Flood-plain landforms.** A variety of constructional and erosional features produced by stream channel migration and flooding. Examples include backswamps, flood-plain splays, meanders, meander belts, meander scrolls, oxbow lakes, and natural levees.

**Fluvial.** Of or pertaining to rivers or streams; produced by stream or river action.

**Footslope.** The concave surface at the base of a hillslope. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

**Genesis, soil.** The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

**Gleyed soil.** Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

**Gravel.** Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

**Ground water.** Water filling all the unblocked pores of the material below the water table.

**Gully.** A small channel with steep sides caused by erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

**Hemic soil material (mucky peat).** Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

**Horizon, soil.** A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

*O horizon.*—An organic layer of fresh and decaying plant residue.

*A horizon.*—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

*E horizon.*—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

*B horizon.*—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay,



sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

**C horizon.**—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

**Humus.** The well decomposed, more or less stable part of the organic matter in mineral soils.

**Hydrologic soil groups.** Refers to soils grouped according to their runoff potential.

The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties include depth to a seasonal high water table, the infiltration rate, and depth to a layer that significantly restricts the downward movement of water. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

**Illuviation.** The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

**Infiltration.** The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

**Infiltration capacity.** The maximum rate at which water can infiltrate into a soil under a given set of conditions.

**Infiltration rate.** The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

**Intake rate.** The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2 .....	very low
0.2 to 0.4 .....	low
0.4 to 0.75 .....	moderately low
0.75 to 1.25 .....	moderate
1.25 to 1.75 .....	moderately high
1.75 to 2.5 .....	high
More than 2.5 .....	very high

**Interfluve.** A landform composed of the relatively undissected upland or ridge between two adjacent valleys containing streams flowing in the same general direction. An elevated area between two drainageways that sheds water to those drainageways.

**Interfluve (geomorphology).** A geomorphic component of hills consisting of the uppermost, comparatively level or gently sloping area of a hill; shoulders of backwearing hillslopes can narrow the upland or can merge, resulting in a strongly convex shape.

**Intermittent stream.** A stream, or reach of a stream, that does not flow year-round but that is commonly dry for 3 or more months out of 12 and whose channel is generally below the local water table. It flows only during wet periods or when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.



**Iron depletions.** See Redoximorphic features.

**Irrigation.** Application of water to soils to assist in production of crops.

**K<sub>sat</sub>.** See Saturated hydraulic conductivity.

**Leaching.** The removal of soluble material from soil or other material by percolating water.

**Linear extensibility.** Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at  $1/3$ - or  $1/10$ -bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

**Liquid limit.** The moisture content at which the soil passes from a plastic to a liquid state.

**Loam.** Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

**Low strength.** The soil is not strong enough to support loads.

**Masses.** See Redoximorphic features.

**Mechanical treatment.** Use of mechanical equipment for seeding, brush management, and other management practices.

**Medium textured soil.** Very fine sandy loam, loam, silt loam, or silt.

**Mine spoil.** An accumulation of displaced earthy material, rock, or other waste material removed during mining or excavation. Also called earthy fill.

**Mineral soil.** Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

**Minimum tillage.** Only the tillage essential to crop production and prevention of soil damage.

**Miscellaneous area.** A kind of map unit that has little or no natural soil and supports little or no vegetation.

**Moderately coarse textured soil.** Coarse sandy loam, sandy loam, or fine sandy loam.

**Moderately fine textured soil.** Clay loam, sandy clay loam, or silty clay loam.

**Mollic epipedon.** A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

**Morphology, soil.** The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

**Mottling, soil.** Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

**Muck.** Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

**Munsell notation.** A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

**Natric horizon.** A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

**Neutral soil.** A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)



**Nodules.** See Redoximorphic features.

**Nutrient, plant.** Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

**Organic matter.** Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low .....	less than 0.5 percent
Low .....	0.5 to 1.0 percent
Moderately low .....	1.0 to 2.0 percent
Moderate .....	2.0 to 4.0 percent
High .....	4.0 to 8.0 percent
Very high .....	more than 8.0 percent

**Parent material.** The unconsolidated organic and mineral material in which soil forms.

**Peat.** Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

**Ped.** An individual natural soil aggregate, such as a granule, a prism, or a block.

**Pedon.** The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

**Permafrost.** Ground, soil, or rock that remains at or below 0 degrees C for at least 2 years. It is defined on the basis of temperature and is not necessarily frozen.

**pH value.** A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

**Plastic limit.** The moisture content at which a soil changes from semisolid to plastic.

**Plasticity index.** The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

**Ponding.** Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

**Poorly graded.** Refers to a coarse-grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

**Pore linings.** See Redoximorphic features.

**Potential native plant community.** See Climax plant community.

**Potential rooting depth (effective rooting depth).** Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

**Productivity, soil.** The capability of a soil for producing a specified plant or sequence of plants under specific management.

**Profile, soil.** A vertical section of the soil extending through all its horizons and into the parent material.

**Reaction, soil.** A measure of acidity or alkalinity of a soil, expressed as pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid .....	less than 3.5
Extremely acid .....	3.5 to 4.4
Very strongly acid .....	4.5 to 5.0
Strongly acid .....	5.1 to 5.5
Moderately acid .....	5.6 to 6.0
Slightly acid .....	6.1 to 6.5



Neutral .....	6.6 to 7.3
Slightly alkaline .....	7.4 to 7.8
Moderately alkaline .....	7.9 to 8.4
Strongly alkaline .....	8.5 to 9.0
Very strongly alkaline .....	9.1 and higher

**Redoximorphic concentrations.** See Redoximorphic features.

**Redoximorphic depletions.** See Redoximorphic features.

**Redoximorphic features.** Redoximorphic features are associated with wetness and result from alternating periods of reduction and oxidation of iron and manganese compounds in the soil. Reduction occurs during saturation with water, and oxidation occurs when the soil is not saturated. Characteristic color patterns are created by these processes. The reduced iron and manganese ions may be removed from a soil if vertical or lateral fluxes of water occur, in which case there is no iron or manganese precipitation in that soil. Wherever the iron and manganese are oxidized and precipitated, they form either soft masses or hard concretions or nodules. Movement of iron and manganese as a result of redoximorphic processes in a soil may result in redoximorphic features that are defined as follows:

1. Redoximorphic concentrations.—These are zones of apparent accumulation of iron-manganese oxides, including:
  - A. Nodules and concretions, which are cemented bodies that can be removed from the soil intact. Concretions are distinguished from nodules on the basis of internal organization. A concretion typically has concentric layers that are visible to the naked eye. Nodules do not have visible organized internal structure; *and*
  - B. Masses, which are noncemented concentrations of substances within the soil matrix; *and*
  - C. Pore linings, i.e., zones of accumulation along pores that may be either coatings on pore surfaces or impregnations from the matrix adjacent to the pores.
2. Redoximorphic depletions.—These are zones of low chroma (chromas less than those in the matrix) where either iron-manganese oxides alone or both iron-manganese oxides and clay have been stripped out, including:
  - A. Iron depletions, i.e., zones that contain low amounts of iron and manganese oxides but have a clay content similar to that of the adjacent matrix; *and*
  - B. Clay depletions, i.e., zones that contain low amounts of iron, manganese, and clay (often referred to as silt coatings or skeletans).
3. Reduced matrix.—This is a soil matrix that has low chroma *in situ* but undergoes a change in hue or chroma within 30 minutes after the soil material has been exposed to air.

**Reduced matrix.** See Redoximorphic features.

**Regolith.** All unconsolidated earth materials above the solid bedrock. It includes material weathered in place from all kinds of bedrock and alluvial, glacial, eolian, lacustrine, and pyroclastic deposits.

**Relief.** The relative difference in elevation between the upland summits and the lowlands or valleys of a given region.

**Rill.** A very small, steep-sided channel resulting from erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. A rill generally is not an obstacle to wheeled vehicles and is shallow enough to be smoothed over by ordinary tillage.

**Riser.** The vertical or steep side slope (e.g., escarpment) of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural, steplike landforms, such as successive stream terraces.



**Road cut.** A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

**Rock fragments.** Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

**Root zone.** The part of the soil that can be penetrated by plant roots.

**Runoff.** The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

**Sand.** As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

**Sapric soil material (muck).** The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

**Saprolite.** Unconsolidated residual material underlying the soil and grading to hard bedrock below.

**Saturated hydraulic conductivity ( $K_{sat}$ ).** The ease with which pores of a saturated soil transmit water. Formally, the proportionality coefficient that expresses the relationship of the rate of water movement to hydraulic gradient in Darcy's Law, a law that describes the rate of water movement through porous media. Commonly abbreviated as " $K_{sat}$ ." Terms describing saturated hydraulic conductivity are *very high*, 100 or more micrometers per second (14.17 or more inches per hour); *high*, 10 to 100 micrometers per second (1.417 to 14.17 inches per hour); *moderately high*, 1 to 10 micrometers per second (0.1417 inch to 1.417 inches per hour); *moderately low*, 0.1 to 1 micrometer per second (0.01417 to 0.1417 inch per hour); *low*, 0.01 to 0.1 micrometer per second (0.001417 to 0.01417 inch per hour); and *very low*, less than 0.01 micrometer per second (less than 0.001417 inch per hour). To convert inches per hour to micrometers per second, multiply inches per hour by 7.0572. To convert micrometers per second to inches per hour, multiply micrometers per second by 0.1417.

**Saturation.** Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

**Series, soil.** A group of soils that have profiles that are almost alike. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

**Sheet erosion.** The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

**Shoulder.** The convex, erosional surface near the top of a hillslope. A shoulder is a transition from summit to backslope.

**Shrink-swell** (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

**Shrub-coppice dune.** A small, streamlined dune that forms around brush and clump vegetation.

**Side slope** (geomorphology). A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel. Side slopes are dominantly colluvium and slope-wash sediments.

**Silt.** As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

**Similar soils.** Soils that share limits of diagnostic criteria, behave and perform in a



similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

**Site index.** A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

**Slope.** The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

**Slow refill** (in tables). The slow filling of ponds, resulting from restricted water transmission in the soil.

**Slow water movement** (in tables). Restricted downward movement of water through the soil. See Saturated hydraulic conductivity.

**Sodium adsorption ratio (SAR).** A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

**Soil.** A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief and by the passage of time.

**Soil separates.** Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand .....	2.0 to 1.0
Coarse sand .....	1.0 to 0.5
Medium sand .....	0.5 to 0.25
Fine sand .....	0.25 to 0.10
Very fine sand .....	0.10 to 0.05
Silt .....	0.05 to 0.002
Clay .....	less than 0.002

**Solum.** The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

**Stream terrace.** One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream; represents the remnants of an abandoned flood plain, stream bed, or valley floor produced during a former state of fluvial erosion or deposition.

**Structure, soil.** The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

**Subsoil.** Technically, the B horizon; roughly, the part of the solum below plow depth.

**Substratum.** The part of the soil below the solum.

**Subsurface layer.** Any surface soil horizon (A, E, AB, or EB) below the surface layer.

**Summit.** The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

**Surface layer.** The soil ordinarily moved in tillage, or its equivalent in uncultivated soil,



ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

**Surface soil.** The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

**Taxadjuncts.** Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

**Terrace (conservation).** An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

**Terrace (geomorphology).** A steplike surface, bordering a valley floor or shoreline, that represents the former position of a flood plain, lake, or seashore. The term is usually applied both to the relatively flat summit surface (tread) that was cut or built by stream or wave action and to the steeper descending slope (scarp or riser) that has graded to a lower base level of erosion.

**Texture, soil.** The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

**Toeslope.** The gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

**Topsoil.** The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

**Upland.** An informal, general term for the higher ground of a region, in contrast with a low-lying adjacent area, such as a valley or plain, or for land at a higher elevation than the flood plain or low stream terrace; land above the footslope zone of the hillslope continuum.

**Variegation.** Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

**Weathering.** All physical disintegration, chemical decomposition, and biologically induced changes in rocks or other deposits at or near the earth’s surface by atmospheric or biologic agents or by circulating surface waters but involving essentially no transport of the altered material.

**Well graded.** Refers to soil material consisting of coarse-grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.







## Tables

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# Soil Survey of Tidewater Cities Area, Virginia

Table 1.--Temperature and Precipitation

(Recorded in the period 1971-2000 at Langley Air Force Base, Virginia)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have--		Average number of growing degree days*	Average	2 years in 10 will have--		Average number of days with 0.10 inch or more	Average snow- fall
				Maximum temp. higher than--	Minimum temp. lower than--			Less than--	More than--		
	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>Units</u>	<u>In</u>	<u>In</u>	<u>In</u>		<u>In</u>
January--	47.4	32.0	39.7	73	9	116	4.08	2.65	5.56	7	2.5
February--	50.4	34.0	42.2	77	16	143	3.58	1.96	5.06	6	2.3
March----	57.8	40.6	49.2	83	22	303	4.72	2.84	6.40	6	0.5
April----	67.0	48.5	57.7	88	32	531	3.30	1.60	5.04	6	0.2
May-----	74.4	58.0	66.2	92	43	812	4.10	2.77	5.35	7	0.0
June-----	82.4	66.8	74.6	96	51	1,038	3.44	1.59	5.03	5	0.0
July-----	87.0	71.9	79.4	98	60	1,223	4.81	2.55	6.99	7	0.0
August---	85.1	70.7	77.9	98	58	1,175	4.57	2.05	6.91	5	0.0
September	79.1	65.0	72.0	94	49	960	4.92	1.60	7.32	5	0.0
October--	69.2	52.7	60.9	87	36	648	3.15	1.71	4.56	4	0.0
November-	60.4	43.6	52.0	80	25	369	3.35	1.68	4.72	5	0.1
December-	52.0	36.1	44.0	75	16	188	3.43	1.68	5.11	6	0.5
Yearly: Average	67.7	51.6	59.7	---	---	---	---	---	---	---	---
Extreme	105	-3	---	99	7	---	---	---	---	---	---
Total--	---	---	---	---	---	7,506	47.44	35.51	54.53	69	6.1

\* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).



# Soil Survey of Tidewater Cities Area, Virginia

Table 2.—Freeze Dates in Spring and Fall

(Recorded in the period 1971-2000 at Langley Air Force Base, Virginia)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Mar. 20	Mar. 25	Apr. 9
2 years in 10 later than--	Mar. 10	Mar. 20	Apr. 4
5 years in 10 later than--	Feb. 19	Mar. 9	Mar. 25
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 30	Nov. 10	Nov. 5
2 years in 10 earlier than--	Dec. 7	Nov. 19	Nov. 10
5 years in 10 earlier than--	Dec. 21	Dec. 5	Nov. 20

Table 3.—Growing Season

(Recorded in the period 1971-2000 at Langley Air Force Base, Virginia)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	<u>Days</u>	<u>Days</u>	<u>Days</u>
9 years in 10	266	240	225
8 years in 10	281	251	231
5 years in 10	308	272	241
2 years in 10	335	293	251
1 year in 10	349	304	256



# Soil Survey of Tidewater Cities Area, Virginia

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
1	Altavista-Urban land complex, 0 to 3 percent slopes-----	14,415	7.1
2	Augusta-Urban land complex, 0 to 2 percent slopes-----	8,370	4.1
3	Axis very fine sandy loam, 0 to 2 percent slopes, very frequently flooded	5,292	2.6
4	Beaches-----	192	*
5	Bethera-Urban land complex, 0 to 2 percent slopes-----	1,999	1.0
6	Bohicket muck, 0 to 1 percent slopes, very frequently flooded-----	3,312	1.6
7	Bojac-Urban land complex, 0 to 3 percent slopes-----	361	0.2
8	Chickahominy-Urban land complex, 0 to 2 percent slopes-----	8,367	4.1
9A	Craven-Urban land complex, 0 to 2 percent slopes-----	4,769	2.3
9B	Craven-Urban land complex, 2 to 6 percent slopes-----	1,009	0.5
10	Dragston-Urban land complex, 0 to 2 percent slopes-----	971	0.5
11	Duckston fine sand, 0 to 2 percent slopes, frequently flooded-----	504	0.2
12	Johnston silt loam, 0 to 2 percent slopes, frequently flooded-----	727	0.4
13	Lawnes loam, 0 to 1 percent slopes, very frequently flooded-----	780	0.4
14	Levy silty clay, 0 to 2 percent slopes, very frequently flooded-----	9	*
15	Munden-Urban land complex, 0 to 3 percent slopes-----	1,074	0.5
16C	Nevarc-Uchee complex, 6 to 15 percent slopes-----	379	0.2
16D	Nevarc-Uchee complex, 15 to 50 percent slopes-----	1,993	1.0
17	Newflat-Urban land complex, 0 to 2 percent slopes-----	1,341	0.7
18	Nimmo-Urban land complex, 0 to 2 percent slopes-----	2,748	1.4
19	Peawick-Urban land complex, 0 to 3 percent slopes-----	341	0.2
20	Seabrook-Urban land complex, 0 to 2 percent slopes-----	949	0.5
21A	Slagle-Urban land complex, 0 to 2 percent slopes-----	2,443	1.2
21B	Slagle-Urban land complex, 2 to 6 percent slopes-----	1,442	0.7
22	State-Urban land complex, 0 to 3 percent slopes-----	4,158	2.0
23	Suffolk fine sandy loam, 2 to 6 percent slopes-----	18	*
24	Tomotley-Urban land complex, 0 to 2 percent slopes-----	21,665	10.6
25	Uchee loamy fine sand, 2 to 6 percent slopes-----	117	*
26	Udorthents-Dumps complex-----	16,151	7.9
27	Urban land-----	13,586	6.7
28	Yemassee-Urban land complex, 0 to 2 percent slopes-----	468	0.2
DAM	Dam-----	5	*
W	Water-----	83,545	41.1
	Total-----	203,500	100.0

\* Less than 0.1 percent.



# Soil Survey of Tidewater Cities Area, Virginia

Table 5.—Land Capability, Virginia Soil Management Group, and Yields per Acre

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Map symbol and soil name	Land capability	Virginia soil management group	Pasture  <u>AUM</u>
1: Altavista-----	2w	B	11.5
Urban land-----	8s	---	---
2: Augusta-----	4w	Z	5.0
Urban land-----	8s	---	---
3: Axis-----	7w	PP	---
4: Beaches-----	8w	---	---
5: Bethera-----	6w	OO	---
Urban land-----	8s	---	---
6: Bohicket-----	8w	PP	---
7: Bojac-----	2s	DD	6.0
Urban land-----	8s	---	---
8: Chickahominy-----	4w	LL	3.0
Urban land-----	8s	---	---
9A: Craven-----	2w	HH	6.0
Urban land-----	8s	---	---
9B: Craven-----	2e	HH	6.0
Urban land-----	8s	---	---
10: Dragston-----	4w	E	6.0
Urban land-----	8s	---	---
11: Duckston-----	7w	QQ	---



# Soil Survey of Tidewater Cities Area, Virginia

Table 5.—Land Capability, Virginia Soil Management Group, and Yields per Acre—Continued

Map symbol and soil name	Land capability	Virginia soil management group	Pasture  AUM
12: Johnston-----	7w	PP	---
13: Lawnes-----	7w	PP	---
14: Levy-----	7w	PP	---
15: Munden-----	2w	F	7.0
Urban land-----	8s	---	---
16C: Nevarc-----	4e	HH	5.5
Uchee-----	4s	DD	5.5
16D: Nevarc-----	7e	HH	4.0
Uchee-----	6e	DD	4.0
17: Newflat-----	4w	LL	5.0
Urban land-----	8s	---	---
18: Nimmo-----	4w	E	3.0
Urban land-----	8s	---	---
19: Peawick-----	2w	HH	7.0
Urban land-----	8s	---	---
20: Seabrook-----	3s	EE	4.0
Urban land-----	8s	---	---
21A: Slagle-----	2e	K	7.5
Urban land-----	8s	---	---
21B: Slagle-----	2e	K	7.5
Urban land-----	8s	---	---
22: State-----	1	B	10.0
Urban land-----	8s	---	---



# Soil Survey of Tidewater Cities Area, Virginia

Table 5.—Land Capability, Virginia Soil Management Group, and Yields per Acre—Continued

Map symbol and soil name	Land capability	Virginia soil management group	Pasture  <u>AUM</u>
23: Suffolk-----	2e	T	7.0
24: Tomotley-----	4w	OO	5.0
Urban land-----	8s	---	---
25: Uchee-----	2s	DD	6.0
26: Udorthents.			
Dumps-----	8s	---	---
27: Urban land-----	8s	---	---
28: Yemassee-----	4w	OO	2.5
Urban land-----	8s	---	---
DAM. Dam			
W. Water			



# Soil Survey of Tidewater Cities Area, Virginia

Table 6.--Prime Farmland

(Only the soils considered prime or important farmland are listed. Urban or built-up areas of the soils listed are not considered prime or important farmland)

Map symbol	Map unit name	Farmland classification
23	Suffolk fine sandy loam, 2 to 6 percent slopes	Prime farmland in all areas

Table 7.--Hydric Soils List

Map symbol	Soil name
3	Axis very fine sandy loam, 0 to 2 percent slopes, very frequently flooded
5	Bethera-Urban land complex, 0 to 2 percent slopes
6	Bohicket muck, 0 to 1 percent slopes, very frequently flooded
8	Chickahominy-Urban land complex, 0 to 2 percent slopes
11	Duckston fine sand, 0 to 2 percent slopes, frequently flooded
12	Johnston silt loam, 0 to 2 percent slopes, frequently flooded
13	Lawnes loam, 0 to 1 percent slopes, very frequently flooded
14	Levy silty clay, 0 to 2 percent slopes, very frequently flooded
18	Nimmo-Urban land complex, 0 to 2 percent slopes
24	Tomotley-Urban land complex, 0 to 2 percent slopes



# Soil Survey of Tidewater Cities Area, Virginia

Table 8.--Forestland Productivity

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber cu ft/ac	
1: Altavista-----	loblolly pine----- longleaf pine----- southern red oak---- white oak-----	91 87 77 77	129 114 52 57	loblolly pine
Urban land.				
2: Augusta-----	American sycamore--- loblolly pine----- southern red oak---- sweetgum----- white oak-----	90 90 80 90 70	100 129 57 100 57	American sycamore, cherrybark oak, loblolly pine, sweetgum, yellow- poplar
Urban land.				
3. Axis				
4. Beaches				
5: Bethera-----	sweetgum-----	95	114	sweetgum
Urban land.				
6: Bohicket-----	---	---	---	---
7: Bojac-----	loblolly pine----- southern red oak---- sweetgum----- Virginia pine-----	80 70 80 75	114 57 86 114	loblolly pine, sweetgum
Urban land.				
8: Chickahominy-----	loblolly pine----- sweetgum-----	88 95	129 114	loblolly pine, sweetgum
Urban land.				
9A, 9B: Craven-----	loblolly pine----- southern red oak---- white oak----- willow oak-----	88 90 90 85	129 72 72 86	loblolly pine
Urban land.				



# Soil Survey of Tidewater Cities Area, Virginia

Table 8.—Forestland Productivity—Continued

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber cu ft/ac	
10: Dragston-----	loblolly pine----- southern red oak---- sweetgum----- yellow-poplar-----	86 80 90 90	129 57 100 86	loblolly pine, sweetgum, yellow- poplar
Urban land.				
11. Duckston				
12: Johnston-----	sweetgum----- water oak-----	94 103	114 100	baldcypress, green ash, loblolly pine, sweetgum
13. Lawnes				
14: Levy-----	---	---	---	baldcypress, sweetgum
15: Munden-----	loblolly pine----- southern red oak---- sweetgum----- white oak-----	90 76 90 76	129 72 100 57	loblolly pine
Urban land.				
16C, 16D: Nevarc-----	loblolly pine----- southern red oak---- sweetgum----- white oak----- yellow-poplar-----	77 70 76 70 80	100 57 72 57 72	loblolly pine
Uchee-----	loblolly pine----- longleaf pine----- southern red oak----	80 67 80	114 72 72	loblolly pine, longleaf pine
17: Newflat-----	loblolly pine----- southern red oak---- sweetgum-----	90 70 95	129 57 114	loblolly pine, sweetgum
Urban land.				
18: Nimmo-----	loblolly pine----- sweetgum----- water oak----- white oak-----	95 95 80 80	143 114 72 57	loblolly pine, sweetgum
Urban land.				



# Soil Survey of Tidewater Cities Area, Virginia

Table 8.—Forestland Productivity—Continued

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber cu ft/ac	
19: Peawick-----	loblolly pine----- southern red oak----	77 73	100 72	loblolly pine
Urban land.				
20: Seabrook-----	loblolly pine----- southern red oak----	81 75	114 62	loblolly pine, longleaf pine
Urban land.				
21A, 21B: Slagle-----	loblolly pine----- southern red oak---- sweetgum----- water oak----- yellow-poplar-----	86 76 86 76 90	129 62 100 72 86	loblolly pine, sweetgum, yellow- poplar
Urban land.				
22: State-----	loblolly pine----- southern red oak---- yellow-poplar-----	86 85 100	129 72 114	loblolly pine, yellow-poplar
Urban land.				
23: Suffolk-----	loblolly pine----- shortleaf pine----- southern red oak----	82 72 70	114 114 57	loblolly pine
24: Tomotley-----	loblolly pine----- water oak----- willow oak-----	97 78 86	143 72 86	loblolly pine
Urban land.				
25: Uchee-----	loblolly pine----- longleaf pine----- southern red oak----	80 67 80	114 72 72	loblolly pine, longleaf pine
26. Udorthents-Dumps				
27. Urban land				



# Soil Survey of Tidewater Cities Area, Virginia

Table 8.—Forestland Productivity—Continued

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber cu ft/ac	
28:				
Yemassee-----	loblolly pine-----	90	129	American sycamore,
	longleaf pine-----	80	100	loblolly pine,
	slash pine-----	88	157	slash pine,
	sweetgum-----	95	114	yellow-poplar
Urban land.				
DAM.				
Dam				
W.				
Water				



# Soil Survey of Tidewater Cities Area, Virginia

Table 9.—Forestland Management, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Limitations affecting construction of haul roads and log landings		Suitability for log landings		Soil rutting hazard	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1: Altavista-----	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
Urban land-----	Not rated		Not rated		Not rated	
2: Augusta-----	Slight		Moderately suited Wetness	0.50	Moderate Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
3: Axis-----	Severe Flooding Wetness Low strength	1.00 1.00 0.50	Poorly suited Ponding Flooding Wetness	1.00 1.00 1.00	Severe Low strength Wetness	1.00 0.50
4: Beaches-----	Not rated		Not rated		Not rated	
5: Bethera-----	Moderate Low strength	0.50	Poorly suited Wetness Ponding Low strength	1.00 0.50 0.50	Severe Low strength	1.00
Urban land-----	Not rated		Not rated		Not rated	
6: Bohicket-----	Severe Flooding Low strength Wetness	1.00 1.00 1.00	Poorly suited Ponding Flooding Low strength	1.00 1.00 1.00	Severe Low strength Wetness	1.00 0.50
7: Bojac-----	Slight		Well suited		Moderate Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
8: Chickahominy-----	Moderate Low strength	0.50	Poorly suited Wetness Low strength	1.00 0.50	Severe Low strength	1.00
Urban land-----	Not rated		Not rated		Not rated	
9A, 9B: Craven-----	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 9.—Forestland Management, Part I—Continued

Map symbol and soil name	Limitations affecting construction of haul roads and log landings		Suitability for log landings		Soil rutting hazard	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10: Dragston-----	Moderate Low strength	0.50	Moderately suited Wetness	0.50	Moderate Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
11: Duckston-----	Severe Flooding Wetness	1.00 1.00	Poorly suited Flooding Wetness	1.00 1.00	Moderate Wetness Low strength	0.50 0.50
12: Johnston-----	Severe Flooding Low strength	1.00 0.50	Poorly suited Ponding Flooding Wetness	1.00 1.00 1.00	Severe Low strength	1.00
13: Lawnes-----	Severe Flooding Wetness Low strength	1.00 1.00 0.50	Poorly suited Ponding Flooding Wetness	1.00 1.00 1.00	Severe Low strength Wetness	1.00 0.50
14: Levy-----	Severe Flooding Wetness Low strength	1.00 1.00 0.50	Poorly suited Ponding Flooding Wetness	1.00 1.00 1.00	Severe Low strength Wetness	1.00 0.50
15: Munden-----	Slight		Well suited		Moderate Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
16C: Nevarc-----	Slight		Moderately suited Slope	0.50	Moderate Low strength	0.50
Uchee-----	Slight		Moderately suited Slope	0.50	Moderate Low strength	0.50
16D: Nevarc-----	Severe Slope Low strength	1.00 0.50	Poorly suited Slope	1.00	Moderate Low strength	0.50
Uchee-----	Moderate Slope	0.50	Poorly suited Slope	1.00	Moderate Low strength	0.50
17: Newflat-----	Moderate Low strength	0.50	Moderately suited Wetness Low strength	0.50 0.50	Severe Low strength	1.00
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 9.—Forestland Management, Part I—Continued

Map symbol and soil name	Limitations affecting construction of haul roads and log landings		Suitability for log landings		Soil rutting hazard	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
18: Nimmo-----	Slight		Poorly suited Wetness	1.00	Moderate Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
19: Peawick-----	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
Urban land-----	Not rated		Not rated		Not rated	
20: Seabrook-----	Slight		Well suited		Moderate Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
21A, 21B: Slagle-----	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
Urban land-----	Not rated		Not rated		Not rated	
22: State-----	Slight		Well suited		Moderate Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
23: Suffolk-----	Slight		Well suited		Moderate Low strength	0.50
24: Tomotley-----	Slight		Poorly suited Wetness	1.00	Moderate Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
25: Uchee-----	Slight		Well suited		Moderate Low strength	0.50
26: Udorthents-----	Not rated		Not rated		Not rated	
Dumps-----	Not rated		Not rated		Not rated	
27: Urban land-----	Not rated		Not rated		Not rated	
28: Yemassee-----	Slight		Well suited		Moderate Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 9.—Forestland Management, Part I—Continued

Map symbol and soil name	Limitations affecting construction of haul roads and log landings		Suitability for log landings		Soil rutting hazard	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
DAM: Dam-----	Not rated		Not rated		Not rated	
W: Water-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 9.—Forestland Management, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1: Altavista-----	Slight		Slight		Moderately suited Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
2: Augusta-----	Slight		Slight		Moderately suited Wetness	0.50
Urban land-----	Not rated		Not rated		Not rated	
3: Axis-----	Slight		Slight		Poorly suited Ponding Flooding Wetness	1.00 1.00 1.00
4: Beaches-----	Not rated		Not rated		Not rated	
5: Bethera-----	Slight		Slight		Poorly suited Wetness Ponding Low strength	1.00 0.50 0.50
Urban land-----	Not rated		Not rated		Not rated	
6: Bohicket-----	Slight		Slight		Poorly suited Ponding Flooding Low strength	1.00 1.00 1.00
7: Bojac-----	Slight		Slight		Well suited	
Urban land-----	Not rated		Not rated		Not rated	
8: Chickahominy-----	Slight		Slight		Poorly suited Wetness Low strength	1.00 0.50
Urban land-----	Not rated		Not rated		Not rated	
9A: Craven-----	Slight		Slight		Moderately suited Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 9.—Forestland Management, Part II—Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
9B:						
Craven-----	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
10:						
Dragston-----	Slight		Slight		Moderately suited Wetness	0.50
Urban land-----	Not rated		Not rated		Not rated	
11:						
Duckston-----	Slight		Slight		Poorly suited Flooding Wetness	1.00 1.00
12:						
Johnston-----	Slight		Slight		Poorly suited Ponding Flooding Wetness	1.00 1.00 1.00
13:						
Lawnes-----	Slight		Slight		Poorly suited Ponding Flooding Wetness	1.00 1.00 1.00
14:						
Levy-----	Slight		Slight		Poorly suited Ponding Flooding Wetness	1.00 1.00 1.00
15:						
Munden-----	Slight		Slight		Well suited	
Urban land-----	Not rated		Not rated		Not rated	
16C:						
Nevarc-----	Slight		Severe Slope/erodibility	0.95	Moderately suited Slope	0.50
Uchee-----	Slight		Moderate Slope/erodibility	0.50	Moderately suited Slope	0.50
16D:						
Nevarc-----	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope	1.00
Uchee-----	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope	1.00
17:						
Newflat-----	Slight		Slight		Moderately suited Wetness Low strength	0.50 0.50
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 9.—Forestland Management, Part II—Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
18: Nimmo-----	Slight		Slight		Poorly suited Wetness	1.00
Urban land-----	Not rated		Not rated		Not rated	
19: Peawick-----	Slight		Slight		Moderately suited Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
20: Seabrook-----	Slight		Slight		Well suited	
Urban land-----	Not rated		Not rated		Not rated	
21A, 21B: Slagle-----	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
22: State-----	Slight		Slight		Well suited	
Urban land-----	Not rated		Not rated		Not rated	
23: Suffolk-----	Slight		Slight		Well suited	
24: Tomotley-----	Slight		Slight		Poorly suited Wetness	1.00
Urban land-----	Not rated		Not rated		Not rated	
25: Uchee-----	Slight		Slight		Well suited	
26: Udorthents-----	Not rated		Not rated		Not rated	
Dumps-----	Not rated		Not rated		Not rated	
27: Urban land-----	Not rated		Not rated		Not rated	
28: Yemassee-----	Slight		Slight		Well suited	
Urban land-----	Not rated		Not rated		Not rated	
DAM: Dam-----	Not rated		Not rated		Not rated	
W: Water-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 9.—Forestland Management, Part III

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1: Altavista-----	Well suited		Well suited		Moderately suited Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
2: Augusta-----	Well suited		Well suited		Well suited	
Urban land-----	Not rated		Not rated		Not rated	
3: Axis-----	Poorly suited Wetness	0.75	Poorly suited Wetness	0.75	Poorly suited Wetness Low strength	1.00 0.50
4: Beaches-----	Not rated		Not rated		Not rated	
5: Bethera-----	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
6: Bohicket-----	Poorly suited Wetness Stickiness; high plasticity index	0.75 0.50	Poorly suited Wetness Stickiness; high plasticity index	0.75 0.50	Poorly suited Low strength Wetness	1.00 1.00
7: Bojac-----	Well suited		Well suited		Well suited	
Urban land-----	Not rated		Not rated		Not rated	
8: Chickahominy-----	Poorly suited Stickiness; high plasticity index	0.75	Poorly suited Stickiness; high plasticity index	0.75	Moderately suited Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
9A, 9B: Craven-----	Poorly suited Stickiness; high plasticity index	0.75	Poorly suited Stickiness; high plasticity index	0.75	Moderately suited Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
10: Dragston-----	Well suited		Well suited		Well suited	
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 9.—Forestland Management, Part III—Continued

Map symbol and soil name	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
11: Duckston-----	Moderately suited Wetness	0.50	Poorly suited Wetness	0.75	Poorly suited Wetness	1.00
12: Johnston-----	Well suited		Well suited		Moderately suited Low strength	0.50
13: Lawnes-----	Poorly suited Wetness	0.75	Poorly suited Wetness	0.75	Poorly suited Wetness Low strength Stickiness; high plasticity index	1.00 0.50 0.50
14: Levy-----	Poorly suited Wetness Stickiness; high plasticity index	0.75 0.75	Poorly suited Wetness Stickiness; high plasticity index	0.75 0.75	Poorly suited Wetness Low strength Stickiness; high plasticity index	1.00 0.50 0.50
15: Munden-----	Well suited		Well suited		Well suited	
Urban land-----	Not rated		Not rated		Not rated	
16C: Nevarc-----	Poorly suited Stickiness; high plasticity index	0.75	Poorly suited Stickiness; high plasticity index Slope	0.75 0.50	Well suited	
Uchee-----	Well suited		Moderately suited Slope	0.50	Well suited	
16D: Nevarc-----	Poorly suited Stickiness; high plasticity index	0.75	Unsuited Slope Stickiness; high plasticity index	1.00 0.75	Moderately suited Slope	0.50
Uchee-----	Well suited		Poorly suited Slope	0.75	Moderately suited Slope	0.50
17: Newflat-----	Poorly suited Stickiness; high plasticity index	0.75	Poorly suited Stickiness; high plasticity index	0.75	Moderately suited Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
18: Nimmo-----	Well suited		Well suited		Well suited	
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 9.—Forestland Management, Part III—Continued

Map symbol and soil name	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
19: Peawick-----	Poorly suited Stickiness; high plasticity index	0.75	Poorly suited Stickiness; high plasticity index	0.75	Moderately suited Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
20: Seabrook-----	Well suited		Well suited		Well suited	
Urban land-----	Not rated		Not rated		Not rated	
21A: Slagle-----	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
21B: Slagle-----	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Low strength	0.50
Urban land-----	Not rated		Not rated		Not rated	
22: State-----	Well suited		Well suited		Well suited	
Urban land-----	Not rated		Not rated		Not rated	
23: Suffolk-----	Well suited		Well suited		Well suited	
24: Tomotley-----	Well suited		Well suited		Well suited	
Urban land-----	Not rated		Not rated		Not rated	
25: Uchee-----	Well suited		Well suited		Well suited	
26: Udorthents-----	Not rated		Not rated		Not rated	
Dumps-----	Not rated		Not rated		Not rated	
27: Urban land-----	Not rated		Not rated		Not rated	
28: Yemassee-----	Well suited		Well suited		Well suited	
Urban land-----	Not rated		Not rated		Not rated	
DAM: Dam-----	Not rated		Not rated		Not rated	
W: Water-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 9.—Forestland Management, Part IV

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Suitability for mechanical site preparation (surface)		Suitability for mechanical site preparation (deep)	
	Rating class and limiting features	Value	Rating class and limiting features	Value
1: Altavista-----	Well suited		Well suited	
Urban land-----	Not rated		Not rated	
2: Augusta-----	Well suited		Well suited	
Urban land-----	Not rated		Not rated	
3: Axis-----	Poorly suited Wetness	0.75	Unsuited Wetness	1.00
4: Beaches-----	Not rated		Not rated	
5: Bethera-----	Well suited		Well suited	
Urban land-----	Not rated		Not rated	
6: Bohicket-----	Poorly suited Wetness	0.75	Unsuited Wetness	1.00
7: Bojac-----	Well suited		Well suited	
Urban land-----	Not rated		Not rated	
8: Chickahominy-----	Poorly suited Stickiness; high plasticity index	0.50	Well suited	
Urban land-----	Not rated		Not rated	
9A, 9B: Craven-----	Poorly suited Stickiness; high plasticity index	0.50	Well suited	
Urban land-----	Not rated		Not rated	
10: Dragston-----	Well suited		Well suited	
Urban land-----	Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 9.—Forestland Management, Part IV—Continued

Map symbol and soil name	Suitability for mechanical site preparation (surface)		Suitability for mechanical site preparation (deep)	
	Rating class and limiting features	Value	Rating class and limiting features	Value
11: Duckston-----	Poorly suited Wetness	0.50	Unsuited Wetness	1.00
12: Johnston-----	Well suited		Well suited	
13: Lawnes-----	Poorly suited Wetness	0.75	Unsuited Wetness	1.00
14: Levy-----	Poorly suited Wetness Stickiness; high plasticity index	0.75 0.50	Unsuited Wetness	1.00
15: Munden-----	Well suited		Well suited	
Urban land-----	Not rated		Not rated	
16C: Nevarc-----	Poorly suited Stickiness; high plasticity index	0.50	Well suited	
Uchee-----	Well suited		Well suited	
16D: Nevarc-----	Poorly suited Slope Stickiness; high plasticity index	0.50 0.50	Poorly suited Slope	0.50
Uchee-----	Poorly suited Slope	0.50	Poorly suited Slope	0.50
17: Newflat-----	Poorly suited Stickiness; high plasticity index	0.50	Well suited	
Urban land-----	Not rated		Not rated	
18: Nimmo-----	Well suited		Well suited	
Urban land-----	Not rated		Not rated	
19: Peawick-----	Poorly suited Stickiness; high plasticity index	0.50	Well suited	
Urban land-----	Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 9.—Forestland Management, Part IV—Continued

Map symbol and soil name	Suitability for mechanical site preparation (surface)		Suitability for mechanical site preparation (deep)	
	Rating class and limiting features	Value	Rating class and limiting features	Value
20: Seabrook-----	Well suited		Well suited	
Urban land-----	Not rated		Not rated	
21A, 21B: Slagle-----	Well suited		Well suited	
Urban land-----	Not rated		Not rated	
22: State-----	Well suited		Well suited	
Urban land-----	Not rated		Not rated	
23: Suffolk-----	Well suited		Well suited	
24: Tomotley-----	Well suited		Well suited	
Urban land-----	Not rated		Not rated	
25: Uchee-----	Well suited		Well suited	
26: Udorthents-----	Not rated		Not rated	
Dumps-----	Not rated		Not rated	
27: Urban land-----	Not rated		Not rated	
28: Yemassee-----	Well suited		Well suited	
Urban land-----	Not rated		Not rated	
DAM: Dam-----	Not rated		Not rated	
W: Water-----	Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 9.--Forestland Management, Part V

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Potential for damage to soil by fire		Potential for seedling mortality	
	Rating class and limiting features	Value	Rating class and limiting features	Value
1: Altavista-----	Moderate Texture/rock fragments	0.50	Low	
Urban land-----	Not rated		Not rated	
2: Augusta-----	Moderate Texture/rock fragments	0.50	Low	
Urban land-----	Not rated		Not rated	
3: Axis-----	Low Texture/rock fragments	0.10	High Wetness Salinity	1.00 1.00
4: Beaches-----	Not rated		Not rated	
5: Bethera-----	Low Texture/rock fragments	0.10	High Wetness Soil reaction	1.00 0.50
Urban land-----	Not rated		Not rated	
6: Bohicket-----	Moderate Texture/surface depth/rock fragments Texture/rock fragments	0.50 0.10	High Wetness Salinity	1.00 1.00
7: Bojac-----	Moderate Texture/rock fragments	0.50	Low	
Urban land-----	Not rated		Not rated	
8: Chickahominy-----	Moderate Texture/rock fragments	0.50	High Wetness Soil reaction	1.00 0.50
Urban land-----	Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 9.—Forestland Management, Part V—Continued

Map symbol and soil name	Potential for damage to soil by fire	Value	Potential for seedling mortality	Value
	Rating class and limiting features		Rating class and limiting features	
9A, 9B: Craven-----	Moderate Texture/rock fragments	0.50	Low	
Urban land-----	Not rated		Not rated	
10: Dragston-----	High Texture/surface depth/rock fragments	1.00	Low	
Urban land-----	Not rated		Not rated	
11: Duckston-----	High Texture/surface depth/rock fragments	1.00	High Wetness Available water	1.00 0.50
12: Johnston-----	Low Texture/rock fragments	0.10	High Wetness	1.00
13: Lawnes-----	Low Texture/rock fragments	0.10	High Wetness Salinity	1.00 0.50
14: Levy-----	Low Texture/rock fragments	0.10	High Wetness Soil reaction	1.00 0.50
15: Munden-----	Moderate Texture/rock fragments	0.50	Low	
Urban land-----	Not rated		Not rated	
16C, 16D: Nevarc-----	Moderate Texture/rock fragments	0.50	Moderate Soil reaction	0.50
Uchee-----	High Texture/surface depth/rock fragments	1.00	Low	
17: Newflat-----	Moderate Texture/rock fragments	0.50	High Wetness	1.00
Urban land-----	Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 9.—Forestland Management, Part V—Continued

Map symbol and soil name	Potential for damage to soil by fire	Value	Potential for seedling mortality	Value
	Rating class and limiting features		Rating class and limiting features	
18: Nimmo-----	Moderate Texture/rock fragments	0.50	High Wetness	1.00
Urban land-----	Not rated		Not rated	
19: Peawick-----	Moderate Texture/rock fragments	0.50	Moderate Soil reaction	0.50
Urban land-----	Not rated		Not rated	
20: Seabrook-----	High Texture/rock fragments	1.00	Low	
Urban land-----	Not rated		Not rated	
21A, 21B: Slagle-----	Moderate Texture/rock fragments	0.50	Low	
Urban land-----	Not rated		Not rated	
22: State-----	Moderate Texture/rock fragments	0.50	Low	
Urban land-----	Not rated		Not rated	
23: Suffolk-----	Moderate Texture/rock fragments	0.50	Low	
24: Tomotley-----	Low Texture/surface depth/rock fragments	0.10	High Wetness Soil reaction	1.00 0.50
Urban land-----	Not rated		Not rated	
25: Uchee-----	High Texture/surface depth/rock fragments	1.00	Low	
26: Udorthents-----	Not rated		Not rated	
Dumps-----	Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 9.—Forestland Management, Part V—Continued

Map symbol and soil name	Potential for damage to soil by fire		Potential for seedling mortality	
	Rating class and limiting features	Value	Rating class and limiting features	Value
27: Urban land-----	Not rated		Not rated	
28: Yemassee-----	Low Texture/rock fragments	0.10	Moderate Wetness	0.50
Urban land-----	Not rated		Not rated	
DAM: Dam-----	Not rated		Not rated	
W: Water-----	Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 10.—Recreation, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1: Altavista-----	Somewhat limited Depth to saturated zone	0.39	Somewhat limited Depth to saturated zone	0.19	Somewhat limited Depth to saturated zone	0.39
Urban land-----	Not rated		Not rated		Not rated	
2: Augusta-----	Somewhat limited Depth to saturated zone	0.98	Somewhat limited Depth to saturated zone	0.75	Somewhat limited Depth to saturated zone	0.98
Urban land-----	Not rated		Not rated		Not rated	
3: Axis-----	Very limited Depth to saturated zone Sodium content Flooding	1.00 1.00 1.00	Very limited Ponding Depth to saturated zone Sodium content	1.00 1.00 1.00	Very limited Depth to saturated zone Sodium content Flooding	1.00 1.00 1.00
4: Beaches-----	Very limited Flooding Too sandy Salinity	1.00 1.00 1.00	Very limited Too sandy Salinity Flooding	1.00 1.00 0.40	Very limited Too sandy Flooding Salinity	1.00 1.00 1.00
5: Bethera-----	Very limited Depth to saturated zone Ponding Slow water movement	1.00 1.00 0.60	Very limited Depth to saturated zone Ponding Slow water movement	1.00 1.00 0.60	Very limited Depth to saturated zone Ponding Slow water movement	1.00 1.00 0.60
Urban land-----	Not rated		Not rated		Not rated	
6: Bohicket-----	Very limited Depth to saturated zone Sodium content Salinity	1.00 1.00 1.00	Very limited Ponding Depth to saturated zone Sodium content	1.00 1.00 1.00	Very limited Depth to saturated zone Sodium content Salinity	1.00 1.00 1.00
7: Bojac-----	Somewhat limited Too sandy	0.01	Somewhat limited Too sandy	0.01	Somewhat limited Too sandy	0.01
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 10.--Recreation, Part I--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
8: Chickahominy-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
	Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
Urban land-----	Not rated		Not rated		Not rated	
9A: Craven-----	Somewhat limited Slow water movement	0.94	Somewhat limited Slow water movement	0.94	Somewhat limited Slow water movement	0.94
Urban land-----	Not rated		Not rated		Not rated	
9B: Craven-----	Somewhat limited Slow water movement	0.94	Somewhat limited Slow water movement	0.94	Somewhat limited Slow water movement Slope	0.94 0.50
Urban land-----	Not rated		Not rated		Not rated	
10: Dragston-----	Somewhat limited Depth to saturated zone	0.81	Somewhat limited Depth to saturated zone	0.48	Somewhat limited Depth to saturated zone	0.81
Urban land-----	Not rated		Not rated		Not rated	
11: Duckston-----	Very limited Depth to saturated zone	1.00	Very limited Too sandy Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone	1.00
	Flooding	1.00	Flooding	0.40	Too sandy Flooding	1.00 1.00
12: Johnston-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
	Flooding	1.00	Ponding	1.00	Flooding	1.00
	Ponding	1.00	Flooding	0.40	Ponding	1.00
13: Lawnes-----	Very limited Depth to saturated zone	1.00	Very limited Ponding Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone	1.00
	Flooding	1.00	Organic matter content	1.00	Organic matter content	1.00
	Ponding	1.00			Flooding	1.00
14: Levy-----	Very limited Depth to saturated zone	1.00	Very limited Ponding Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone	1.00
	Flooding	1.00	Sodium content	1.00	Flooding	1.00
	Ponding	1.00			Ponding	1.00



Soil Survey of Tidewater Cities Area, Virginia

Table 10.—Recreation, Part I—Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
15: Munden-----	Somewhat limited Too sandy Depth to saturated zone	 0.84 0.39	Somewhat limited Too sandy Depth to saturated zone	 0.84 0.19	Somewhat limited Too sandy Depth to saturated zone	 0.84 0.39
Urban land-----	Not rated		Not rated		Not rated	
16C: Nevarc-----	Somewhat limited Slow water movement Depth to saturated zone Slope	 0.94  0.39 0.37	Somewhat limited Slow water movement Slope Depth to saturated zone	 0.94  0.37 0.19	Very limited Slope Slow water movement Depth to saturated zone	 1.00 0.94  0.39
Uchee-----	Somewhat limited Too sandy Slope	 0.84 0.37	Somewhat limited Too sandy Slope	 0.84 0.37	Very limited Slope Too sandy	 1.00 0.84
16D: Nevarc-----	Very limited Slope Slow water movement Depth to saturated zone	 1.00 0.94  0.39	Very limited Slope Slow water movement Depth to saturated zone	 1.00 0.94  0.19	Very limited Slope Slow water movement Depth to saturated zone	 1.00 0.94  0.39
Uchee-----	Very limited Slope Too sandy	 1.00 0.84	Very limited Slope Too sandy	 1.00 0.84	Very limited Slope Too sandy	 1.00 0.84
17: Newflat-----	Very limited Depth to saturated zone Slow water movement	 1.00 1.00	Very limited Slow water movement Depth to saturated zone	 1.00 0.99	Very limited Depth to saturated zone Slow water movement	 1.00 1.00
Urban land-----	Not rated		Not rated		Not rated	
18: Nimmo-----	Very limited Depth to saturated zone	 1.00	Very limited Depth to saturated zone	 1.00	Very limited Depth to saturated zone	 1.00
Urban land-----	Not rated		Not rated		Not rated	
19: Peawick-----	Very limited Slow water movement Depth to saturated zone	 1.00 0.39	Very limited Slow water movement Depth to saturated zone	 1.00 0.19	Very limited Slow water movement Depth to saturated zone	 1.00 0.39
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 10.—Recreation, Part I—Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
20: Seabrook-----	Somewhat limited Too sandy	0.81	Somewhat limited Too sandy	0.81	Somewhat limited Too sandy	0.81
Urban land-----	Not rated		Not rated		Not rated	
21A, 21B: Slagle-----	Somewhat limited Slow water movement	0.60	Somewhat limited Slow water movement	0.60	Somewhat limited Slow water movement	0.60
	Depth to saturated zone	0.39	Depth to saturated zone	0.19	Slope Depth to saturated zone	0.50 0.39
Urban land-----	Not rated		Not rated		Not rated	
22: State-----	Very limited Flooding	1.00	Not limited		Not limited	
Urban land-----	Not rated		Not rated		Not rated	
23: Suffolk-----	Somewhat limited Too sandy	0.07	Somewhat limited Too sandy	0.07	Somewhat limited Slope Too sandy	0.50 0.07
24: Tomotley-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Urban land-----	Not rated		Not rated		Not rated	
25: Uchee-----	Somewhat limited Too sandy	0.84	Somewhat limited Too sandy	0.84	Somewhat limited Too sandy Slope	0.84 0.50
26: Udorthents-----	Not rated		Not rated		Not rated	
Dumps-----	Not rated		Not rated		Not rated	
27: Urban land-----	Not rated		Not rated		Not rated	
28: Yemassee-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Urban land-----	Not rated		Not rated		Not rated	
DAM: Dam-----	Not rated		Not rated		Not rated	
W: Water-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 10.—Recreation, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Paths and trails		Off-road motorcycle trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1: Altavista-----	Not limited		Not limited		Somewhat limited Depth to saturated zone	0.19
Urban land-----	Not rated		Not rated		Not rated	
2: Augusta-----	Somewhat limited Depth to saturated zone	0.44	Somewhat limited Depth to saturated zone	0.44	Somewhat limited Depth to saturated zone	0.75
Urban land-----	Not rated		Not rated		Not rated	
3: Axis-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Ponding	1.00
	Ponding	1.00	Ponding	1.00	Flooding	1.00
	Flooding	0.60	Flooding	0.60	Sodium content	1.00
4: Beaches-----	Very limited Too sandy	1.00	Very limited Too sandy	1.00	Very limited Flooding	1.00
	Flooding	0.40	Flooding	0.40	Droughty	1.00
					Salinity	1.00
5: Bethera-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
	Ponding	1.00	Ponding	1.00	Ponding	1.00
Urban land-----	Not rated		Not rated		Not rated	
6: Bohicket-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Ponding	1.00
	Ponding	1.00	Ponding	1.00	Flooding	1.00
	Flooding	0.60	Flooding	0.60	Salinity	1.00
7: Bojac-----	Somewhat limited Too sandy	0.01	Somewhat limited Too sandy	0.01	Not limited	
Urban land-----	Not rated		Not rated		Not rated	
8: Chickahominy-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 10.—Recreation, Part II—Continued

Map symbol and soil name	Paths and trails		Off-road motorcycle trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
9A: Craven-----	Not limited		Not limited		Not limited	
Urban land-----	Not rated		Not rated		Not rated	
9B: Craven-----	Not limited		Not limited		Not limited	
Urban land-----	Not rated		Not rated		Not rated	
10: Dragston-----	Somewhat limited Depth to saturated zone	0.11	Somewhat limited Depth to saturated zone	0.11	Somewhat limited Depth to saturated zone	0.48
Urban land-----	Not rated		Not rated		Not rated	
11: Duckston-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Flooding Depth to saturated zone	1.00
	Too sandy	1.00	Too sandy	1.00		
	Flooding	0.40	Flooding	0.40	Droughty	1.00
12: Johnston-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Flooding Depth to saturated zone	1.00
	Ponding	1.00	Ponding	1.00		
	Flooding	0.40	Flooding	0.40	Ponding	1.00
13: Lawnes-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Ponding Flooding	1.00
	Organic matter content	1.00	Organic matter content	1.00	Organic matter content	1.00
	Ponding	1.00	Ponding	1.00		
14: Levy-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Ponding Flooding Depth to saturated zone	1.00
	Ponding	1.00	Ponding	1.00		
	Flooding	0.60	Flooding	0.60		
15: Munden-----	Somewhat limited Too sandy	0.84	Somewhat limited Too sandy	0.84	Somewhat limited Depth to saturated zone	0.19
Urban land-----	Not rated		Not rated		Not rated	
16C: Nevarc-----	Not limited		Not limited		Somewhat limited Slope Depth to saturated zone	0.37 0.19



# Soil Survey of Tidewater Cities Area, Virginia

Table 10.—Recreation, Part II—Continued

Map symbol and soil name	Paths and trails		Off-road motorcycle trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
16C: Uchee-----	Somewhat limited Too sandy	0.84	Somewhat limited Too sandy	0.84	Somewhat limited Slope Droughty	0.37 0.01
16D: Nevarc-----	Very limited Slope	1.00	Somewhat limited Slope	0.56	Very limited Slope Depth to saturated zone	1.00 0.19
Uchee-----	Somewhat limited Too sandy Slope	0.84 0.50	Somewhat limited Too sandy	0.84	Very limited Slope Droughty	1.00 0.01
17: Newflat-----	Somewhat limited Depth to saturated zone	0.99	Somewhat limited Depth to saturated zone	0.99	Somewhat limited Depth to saturated zone	0.99
Urban land-----	Not rated		Not rated		Not rated	
18: Nimmo-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Urban land-----	Not rated		Not rated		Not rated	
19: Peawick-----	Not limited		Not limited		Somewhat limited Depth to saturated zone	0.19
Urban land-----	Not rated		Not rated		Not rated	
20: Seabrook-----	Somewhat limited Too sandy	0.81	Somewhat limited Too sandy	0.81	Somewhat limited Droughty	0.83
Urban land-----	Not rated		Not rated		Not rated	
21A: Slagle-----	Not limited		Not limited		Somewhat limited Depth to saturated zone	0.19
Urban land-----	Not rated		Not rated		Not rated	
21B: Slagle-----	Not limited		Not limited		Somewhat limited Depth to saturated zone	0.19
Urban land-----	Not rated		Not rated		Not rated	
22: State-----	Not limited		Not limited		Not limited	
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 10.—Recreation, Part II—Continued

Map symbol and soil name	Paths and trails		Off-road motorcycle trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
23: Suffolk-----	Somewhat limited Too sandy	0.07	Somewhat limited Too sandy	0.07	Not limited	
24: Tomotley-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Urban land-----	Not rated		Not rated		Not rated	
25: Uchee-----	Somewhat limited Too sandy	0.84	Somewhat limited Too sandy	0.84	Somewhat limited Droughty	0.01
26: Udorthents-----	Not rated		Not rated		Not rated	
Dumps-----	Not rated		Not rated		Not rated	
27: Urban land-----	Not rated		Not rated		Not rated	
28: Yemassee-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Urban land-----	Not rated		Not rated		Not rated	
DAM: Dam-----	Not rated		Not rated		Not rated	
W: Water-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 11.—Building Site Development, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1: Altavista-----	Somewhat limited Depth to saturated zone	0.39	Very limited Depth to saturated zone	1.00	Somewhat limited Depth to saturated zone	0.39
Urban land-----	Not rated		Not rated		Not rated	
2: Augusta-----	Somewhat limited Depth to saturated zone	0.98	Very limited Depth to saturated zone	1.00	Somewhat limited Depth to saturated zone	0.98
Urban land-----	Not rated		Not rated		Not rated	
3: Axis-----	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00
4: Beaches-----	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
5: Bethera-----	Very limited Depth to saturated zone Ponding Shrink-swell	1.00 1.00 0.50	Very limited Depth to saturated zone Ponding Shrink-swell	1.00 1.00 0.50	Very limited Depth to saturated zone Ponding Shrink-swell	1.00 1.00 0.50
Urban land-----	Not rated		Not rated		Not rated	
6: Bohicket-----	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00
7: Bojac-----	Not limited		Somewhat limited Depth to saturated zone	0.16	Not limited	
Urban land-----	Not rated		Not rated		Not rated	
8: Chickahominy-----	Very limited Depth to saturated zone Shrink-swell	1.00 1.00	Very limited Depth to saturated zone Shrink-swell	1.00 1.00	Very limited Depth to saturated zone Shrink-swell	1.00 1.00
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 11.--Building Site Development, Part I--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
9A, 9B: Craven-----	Somewhat limited Shrink-swell	0.50	Somewhat limited Depth to saturated zone Shrink-swell	0.99 0.50	Somewhat limited Shrink-swell	0.50
Urban land-----	Not rated		Not rated		Not rated	
10: Dragston-----	Somewhat limited Depth to saturated zone	0.81	Very limited Depth to saturated zone	1.00	Somewhat limited Depth to saturated zone	0.81
Urban land-----	Not rated		Not rated		Not rated	
11: Duckston-----	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00
12: Johnston-----	Very limited Flooding Depth to saturated zone Ponding	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Ponding	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Ponding	1.00 1.00 1.00
13: Lawnes-----	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00
14: Levy-----	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00
15: Munden-----	Somewhat limited Depth to saturated zone	0.39	Very limited Depth to saturated zone	1.00	Somewhat limited Depth to saturated zone	0.39
Urban land-----	Not rated		Not rated		Not rated	
16C: Nevarc-----	Somewhat limited Shrink-swell Depth to saturated zone Slope	0.50 0.39 0.37	Very limited Depth to saturated zone Shrink-swell Slope	1.00 0.50 0.37	Very limited Slope Shrink-swell Depth to saturated zone	1.00 0.50 0.39
Uchee-----	Somewhat limited Slope	0.37	Somewhat limited Depth to saturated zone Slope	0.61 0.37	Very limited Slope	1.00



# Soil Survey of Tidewater Cities Area, Virginia

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
16D: Nevarc-----	Very limited Slope Shrink-swell Depth to saturated zone	1.00 0.50 0.39	Very limited Slope Depth to saturated zone Shrink-swell	1.00 1.00 0.50	Very limited Slope Shrink-swell Depth to saturated zone	1.00 0.50 0.39
Uchee-----	Very limited Slope	1.00	Very limited Slope Depth to saturated zone	1.00 0.61	Very limited Slope	1.00
17: Newflat-----	Very limited Depth to saturated zone Shrink-swell	1.00 1.00	Very limited Depth to saturated zone Shrink-swell	1.00 1.00	Very limited Depth to saturated zone Shrink-swell	1.00 1.00
Urban land-----	Not rated		Not rated		Not rated	
18: Nimmo-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Urban land-----	Not rated		Not rated		Not rated	
19: Peawick-----	Very limited Shrink-swell Depth to saturated zone	1.00 0.39	Very limited Depth to saturated zone Shrink-swell	1.00 1.00	Very limited Shrink-swell Depth to saturated zone	1.00 0.39
Urban land-----	Not rated		Not rated		Not rated	
20: Seabrook-----	Not limited		Somewhat limited Depth to saturated zone	0.99	Not limited	
Urban land-----	Not rated		Not rated		Not rated	
21A, 21B: Slagle-----	Somewhat limited Shrink-swell Depth to saturated zone	0.50 0.39	Very limited Depth to saturated zone Shrink-swell	1.00 0.50	Somewhat limited Shrink-swell Depth to saturated zone	0.50 0.39
Urban land-----	Not rated		Not rated		Not rated	
22: State-----	Very limited Flooding	1.00	Very limited Flooding Depth to saturated zone	1.00 0.15	Very limited Flooding	1.00
Urban land-----	Not rated		Not rated		Not rated	
23: Suffolk-----	Not limited		Not limited		Not limited	



# Soil Survey of Tidewater Cities Area, Virginia

Table 11.--Building Site Development, Part I--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
24: Tomotley-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Urban land-----	Not rated		Not rated		Not rated	
25: Uchee-----	Not limited		Somewhat limited Depth to saturated zone	0.61	Not limited	
26: Udorthents-----	Not rated		Not rated		Not rated	
Dumps-----	Not rated		Not rated		Not rated	
27: Urban land-----	Not rated		Not rated		Not rated	
28: Yemassee-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Urban land-----	Not rated		Not rated		Not rated	
DAM: Dam-----	Not rated		Not rated		Not rated	
W: Water-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 11.--Building Site Development, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Local roads and streets		Shallow excavations		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1: Altavista-----	Somewhat limited Low strength Depth to saturated zone	0.78 0.19	Very limited Depth to saturated zone Cutbanks cave	1.00 1.00	Somewhat limited Depth to saturated zone	0.19
Urban land-----	Not rated		Not rated		Not rated	
2: Augusta-----	Somewhat limited Depth to saturated zone Low strength	0.75 0.22	Very limited Depth to saturated zone Cutbanks cave	1.00 1.00	Somewhat limited Depth to saturated zone	0.75
Urban land-----	Not rated		Not rated		Not rated	
3: Axis-----	Very limited Ponding Depth to saturated zone Flooding	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Sodium content	1.00 1.00 1.00
4: Beaches-----	Very limited Flooding	1.00	Very limited Cutbanks cave Flooding	1.00 0.80	Very limited Flooding Droughty Salinity	1.00 1.00 1.00
5: Bethera-----	Very limited Depth to saturated zone Low strength Ponding	1.00 1.00 1.00	Very limited Depth to saturated zone Ponding Cutbanks cave	1.00 1.00 0.10	Very limited Depth to saturated zone Ponding	1.00 1.00
Urban land-----	Not rated		Not rated		Not rated	
6: Bohicket-----	Very limited Ponding Depth to saturated zone Flooding	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Salinity	1.00 1.00 1.00
7: Bojac-----	Not limited		Very limited Cutbanks cave Depth to saturated zone	1.00 0.16	Not limited	
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
8: Chickahominy-----	Very limited Depth to saturated zone Low strength Shrink-swell	1.00 1.00 1.00	Very limited Depth to saturated zone Too clayey Cutbanks cave	1.00 0.28 0.10	Very limited Depth to saturated zone	1.00
Urban land-----	Not rated		Not rated		Not rated	
9A, 9B: Craven-----	Very limited Low strength Shrink-swell	1.00 0.50	Somewhat limited Depth to saturated zone Too clayey Cutbanks cave	0.99 0.28 0.10	Not limited	
Urban land-----	Not rated		Not rated		Not rated	
10: Dragston-----	Somewhat limited Depth to saturated zone	0.48	Very limited Depth to saturated zone Cutbanks cave	1.00 1.00	Somewhat limited Depth to saturated zone	0.48
Urban land-----	Not rated		Not rated		Not rated	
11: Duckston-----	Very limited Depth to saturated zone Flooding	1.00 1.00	Very limited Depth to saturated zone Cutbanks cave Flooding	1.00 1.00 0.80	Very limited Flooding Depth to saturated zone Droughty	1.00 1.00 1.00
12: Johnston-----	Very limited Depth to saturated zone Flooding Ponding	1.00 1.00 1.00	Very limited Depth to saturated zone Cutbanks cave Ponding	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Ponding	1.00 1.00 1.00
13: Lawnes-----	Very limited Ponding Depth to saturated zone Flooding	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Organic matter content	1.00 1.00 1.00
14: Levy-----	Very limited Ponding Depth to saturated zone Flooding	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00
15: Munden-----	Somewhat limited Depth to saturated zone	0.19	Very limited Depth to saturated zone Cutbanks cave	1.00 1.00	Somewhat limited Depth to saturated zone	0.19
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 11.--Building Site Development, Part II--Continued

Map symbol and soil name	Local roads and streets		Shallow excavations		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
16C: Nevarc-----	Very limited Low strength Shrink-swell Slope	1.00 0.50 0.37	Very limited Depth to saturated zone Slope Too clayey	1.00 0.37 0.12	Somewhat limited Slope Depth to saturated zone	0.37 0.19
Uchee-----	Somewhat limited Slope	0.37	Very limited Cutbanks cave Depth to saturated zone Slope	1.00 0.61 0.37	Somewhat limited Slope Droughty	0.37 0.01
16D: Nevarc-----	Very limited Slope Low strength Shrink-swell	1.00 1.00 0.50	Very limited Slope Depth to saturated zone Too clayey	1.00 1.00 0.12	Very limited Slope Depth to saturated zone	1.00 0.19
Uchee-----	Very limited Slope	1.00	Very limited Slope Cutbanks cave Depth to saturated zone	1.00 1.00 0.61	Very limited Slope Droughty	1.00 0.01
17: Newflat-----	Very limited Low strength Shrink-swell Depth to saturated zone	1.00 1.00 0.99	Very limited Depth to saturated zone Too clayey Cutbanks cave	1.00 0.28 0.10	Somewhat limited Depth to saturated zone	0.99
Urban land-----	Not rated		Not rated		Not rated	
18: Nimmo-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Cutbanks cave	1.00 1.00	Very limited Depth to saturated zone	1.00
Urban land-----	Not rated		Not rated		Not rated	
19: Peawick-----	Very limited Low strength Shrink-swell Depth to saturated zone	1.00 1.00 0.19	Very limited Depth to saturated zone Too clayey Cutbanks cave	1.00 0.50 0.10	Somewhat limited Depth to saturated zone	0.19
Urban land-----	Not rated		Not rated		Not rated	
20: Seabrook-----	Not limited		Very limited Cutbanks cave Depth to saturated zone	1.00 0.99	Somewhat limited Droughty	0.83
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
21A, 21B: Slagle-----	Very limited Low strength Shrink-swell Depth to saturated zone	1.00 0.50 0.19	Very limited Depth to saturated zone Cutbanks cave	1.00 0.10	Somewhat limited Depth to saturated zone	0.19
Urban land-----	Not rated		Not rated		Not rated	
22: State-----	Somewhat limited Flooding	0.40	Somewhat limited Depth to saturated zone Cutbanks cave	0.15 0.10	Not limited	
Urban land-----	Not rated		Not rated		Not rated	
23: Suffolk-----	Not limited		Very limited Cutbanks cave	1.00	Not limited	
24: Tomotley-----	Very limited Depth to saturated zone Low strength	1.00 0.22	Very limited Depth to saturated zone Cutbanks cave	1.00 1.00	Very limited Depth to saturated zone	1.00
Urban land-----	Not rated		Not rated		Not rated	
25: Uchee-----	Not limited		Very limited Cutbanks cave Depth to saturated zone	1.00 0.61	Somewhat limited Droughty	0.01
26: Udorthents-----	Not rated		Not rated		Not rated	
Dumps-----	Not rated		Not rated		Not rated	
27: Urban land-----	Not rated		Not rated		Not rated	
28: Yemassee-----	Very limited Depth to saturated zone Frost action	1.00 1.00	Very limited Depth to saturated zone Cutbanks cave	1.00 0.10	Very limited Depth to saturated zone	1.00
Urban land-----	Not rated		Not rated		Not rated	
DAM: Dam-----	Not rated		Not rated		Not rated	
W: Water-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 12.—Sanitary Facilities, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
1: Altavista-----	Very limited Depth to saturated zone Seepage, bottom layer Slow water movement	1.00 1.00 0.50	Very limited Depth to saturated zone Seepage	1.00 0.50
Urban land-----	Not rated		Not rated	
2: Augusta-----	Very limited Depth to saturated zone Slow water movement	1.00 0.50	Very limited Depth to saturated zone Seepage	1.00 1.00
Urban land-----	Not rated		Not rated	
3: Axis-----	Very limited Flooding Ponding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00
4: Beaches-----	Very limited Flooding Filtering capacity Seepage, bottom layer	1.00 1.00 1.00	Very limited Flooding Seepage Slope	1.00 1.00 0.08
5: Bethera-----	Very limited Depth to saturated zone Slow water movement Ponding	1.00 1.00 1.00	Very limited Depth to saturated zone Ponding	1.00 1.00
Urban land-----	Not rated		Not rated	
6: Bohicket-----	Very limited Flooding Slow water movement Ponding	1.00 1.00 1.00	Very limited Ponding Flooding Organic matter content	1.00 1.00 1.00



# Soil Survey of Tidewater Cities Area, Virginia

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
7: Bojac-----	Very limited Seepage, bottom layer Depth to saturated zone	1.00 0.43	Very limited Seepage	1.00
Urban land-----	Not rated		Not rated	
8: Chickahominy-----	Very limited Slow water movement Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone	1.00
Urban land-----	Not rated		Not rated	
9A: Craven-----	Very limited Slow water movement Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone	1.00
Urban land-----	Not rated		Not rated	
9B: Craven-----	Very limited Slow water movement Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone Slope	1.00 0.32
Urban land-----	Not rated		Not rated	
10: Dragston-----	Very limited Depth to saturated zone Seepage, bottom layer	1.00 1.00	Very limited Seepage Depth to saturated zone	1.00 1.00
Urban land-----	Not rated		Not rated	
11: Duckston-----	Very limited Flooding Depth to saturated zone Filtering capacity	1.00 1.00 1.00	Very limited Flooding Seepage Depth to saturated zone	1.00 1.00 1.00
12: Johnston-----	Very limited Flooding Depth to saturated zone Seepage, bottom layer	1.00 1.00 1.00	Very limited Flooding Seepage Depth to saturated zone	1.00 1.00 1.00



Soil Survey of Tidewater Cities Area, Virginia

Table 12.--Sanitary Facilities, Part I--Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
13: Lawnes-----	Very limited Flooding Ponding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00
14: Levy-----	Very limited Flooding Slow water movement Ponding	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00
15: Munden-----	Very limited Depth to saturated zone Seepage, bottom layer	1.00 1.00	Very limited Depth to saturated zone Seepage	1.00 1.00
Urban land-----	Not rated		Not rated	
16C: Nevarc-----	Very limited Slow water movement Depth to saturated zone Seepage, bottom layer	1.00 1.00 1.00	Very limited Slope Seepage Depth to saturated zone	1.00 1.00 0.75
Uchee-----	Very limited Slow water movement Depth to saturated zone Slope	1.00 0.99 0.37	Very limited Seepage Slope	1.00 1.00
16D: Nevarc-----	Very limited Slow water movement Depth to saturated zone Slope	1.00 1.00 1.00	Very limited Slope Seepage Depth to saturated zone	1.00 1.00 0.75
Uchee-----	Very limited Slope Slow water movement Depth to saturated zone	1.00 1.00 0.99	Very limited Slope Seepage	1.00 1.00



# Soil Survey of Tidewater Cities Area, Virginia

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
17: Newflat-----	Very limited Slow water movement Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone	1.00
Urban land-----	Not rated		Not rated	
18: Nimmo-----	Very limited Depth to saturated zone Seepage, bottom layer Slow water movement	1.00 1.00 0.50	Very limited Depth to saturated zone Seepage	1.00 1.00
Urban land-----	Not rated		Not rated	
19: Peawick-----	Very limited Slow water movement Depth to saturated zone	1.00 1.00	Somewhat limited Depth to saturated zone	0.75
Urban land-----	Not rated		Not rated	
20: Seabrook-----	Very limited Depth to saturated zone Seepage, bottom layer Filtering capacity	1.00 1.00 1.00	Very limited Seepage Depth to saturated zone	1.00 1.00
Urban land-----	Not rated		Not rated	
21A, 21B: Slagle-----	Very limited Depth to saturated zone Slow water movement	1.00 1.00	Very limited Depth to saturated zone Slope	1.00 0.32
Urban land-----	Not rated		Not rated	
22: State-----	Very limited Seepage, bottom layer Slow water movement Depth to saturated zone	1.00 0.50 0.40	Very limited Seepage Flooding	1.00 0.40
Urban land-----	Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
23: Suffolk-----	Very limited Seepage, bottom layer Slow water movement	1.00 0.50	Very limited Seepage Slope	1.00 0.32
24: Tomotley-----	Very limited Depth to saturated zone Slow water movement	1.00 0.68	Very limited Depth to saturated zone Seepage	1.00 0.50
Urban land-----	Not rated		Not rated	
25: Uchee-----	Very limited Slow water movement Depth to saturated zone	1.00 0.99	Very limited Seepage Slope	1.00 0.32
26: Udorthents-----	Not rated		Not rated	
Dumps-----	Not rated		Not rated	
27: Urban land-----	Not rated		Not rated	
28: Yemassee-----	Very limited Depth to saturated zone Slow water movement	1.00 0.50	Very limited Depth to saturated zone Seepage	1.00 1.00
Urban land-----	Not rated		Not rated	
DAM: Dam-----	Not rated		Not rated	
W: Water-----	Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 12.—Sanitary Facilities, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1: Altavista-----	Very limited Depth to saturated zone Seepage, bottom layer	1.00 1.00	Very limited Depth to saturated zone	1.00	Somewhat limited Depth to saturated zone	0.86
Urban land-----	Not rated		Not rated		Not rated	
2: Augusta-----	Very limited Depth to saturated zone Too sandy	1.00 0.50	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Too sandy	0.99 0.50
Urban land-----	Not rated		Not rated		Not rated	
3: Axis-----	Very limited Flooding Depth to saturated zone Ponding	1.00 1.00 1.00	Very limited Flooding Ponding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Depth to saturated zone Sodium content	1.00 1.00 1.00
4: Beaches-----	Very limited Flooding Seepage, bottom layer Too sandy	1.00 1.00 1.00	Very limited Flooding Seepage	1.00 1.00	Very limited Too sandy Seepage Salinity	1.00 1.00 1.00
5: Bethera-----	Very limited Depth to saturated zone Ponding Too clayey	1.00 1.00 0.50	Very limited Depth to saturated zone Ponding	1.00 1.00	Very limited Depth to saturated zone Hard to compact Ponding	1.00 1.00 1.00
Urban land-----	Not rated		Not rated		Not rated	
6: Bohicket-----	Very limited Flooding Depth to saturated zone Ponding	1.00 1.00 1.00	Very limited Flooding Ponding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Depth to saturated zone Sodium content	1.00 1.00 1.00
7: Bojac-----	Very limited Depth to saturated zone Seepage, bottom layer Too sandy	1.00 1.00 0.50	Very limited Depth to saturated zone Seepage	1.00 1.00	Very limited Seepage Too sandy	1.00 0.50



# Soil Survey of Tidewater Cities Area, Virginia

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
7: Urban land-----	Not rated		Not rated		Not rated	
8: Chickahominy-----	Very limited Depth to saturated zone Too clayey	1.00  1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Too clayey	1.00  1.00
Urban land-----	Not rated		Not rated		Not rated	
9A, 9B: Craven-----	Very limited Depth to saturated zone Too clayey	1.00  1.00	Very limited Depth to saturated zone	1.00	Very limited Too clayey Depth to saturated zone	1.00  0.47
Urban land-----	Not rated		Not rated		Not rated	
10: Dragston-----	Very limited Depth to saturated zone Seepage, bottom layer Too sandy	1.00  1.00  1.00	Very limited Depth to saturated zone Seepage	1.00  1.00	Very limited Too sandy Seepage Depth to saturated zone	1.00  1.00  0.96
Urban land-----	Not rated		Not rated		Not rated	
11: Duckston-----	Very limited Flooding Depth to saturated zone Seepage, bottom layer	1.00  1.00  1.00	Very limited Flooding Depth to saturated zone Seepage	1.00  1.00  1.00	Very limited Depth to saturated zone Too sandy Seepage	1.00  1.00  1.00
12: Johnston-----	Very limited Flooding Depth to saturated zone Seepage, bottom layer	1.00  1.00  1.00	Very limited Flooding Depth to saturated zone Seepage	1.00  1.00  1.00	Very limited Depth to saturated zone Seepage Ponding	1.00  1.00  1.00
13: Lawnes-----	Very limited Flooding Depth to saturated zone Ponding	1.00  1.00  1.00	Very limited Flooding Ponding Depth to saturated zone	1.00  1.00  1.00	Very limited Ponding Depth to saturated zone	1.00  1.00
14: Levy-----	Very limited Flooding Depth to saturated zone Ponding	1.00  1.00  1.00	Very limited Flooding Ponding Depth to saturated zone	1.00  1.00  1.00	Very limited Ponding Depth to saturated zone Too clayey	1.00  1.00  1.00



# Soil Survey of Tidewater Cities Area, Virginia

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
15: Munden-----	Very limited Depth to saturated zone Too sandy Seepage, bottom layer	1.00 1.00 1.00	Very limited Depth to saturated zone Seepage	1.00 1.00	Very limited Too sandy Seepage Depth to saturated zone	1.00 1.00 0.86
Urban land-----	Not rated		Not rated		Not rated	
16C: Nevarc-----	Very limited Too clayey Seepage, bottom layer Depth to saturated zone	1.00 1.00 0.99	Somewhat limited Depth to saturated zone Slope	0.75 0.37	Very limited Too clayey Depth to saturated zone Slope	1.00 0.86 0.37
Uchee-----	Somewhat limited Slope	0.37	Very limited Seepage Slope	1.00 0.37	Somewhat limited Slope	0.37
16D: Nevarc-----	Very limited Slope Too clayey Seepage, bottom layer	1.00 1.00 1.00	Very limited Slope Depth to saturated zone	1.00 0.75	Very limited Slope Too clayey Depth to saturated zone	1.00 1.00 0.86
Uchee-----	Very limited Slope	1.00	Very limited Slope Seepage	1.00 1.00	Very limited Slope	1.00
17: Newflat-----	Very limited Depth to saturated zone Too clayey	1.00 1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Too clayey	1.00 1.00
Urban land-----	Not rated		Not rated		Not rated	
18: Nimmo-----	Very limited Depth to saturated zone Too sandy Seepage, bottom layer	1.00 1.00 1.00	Very limited Depth to saturated zone Seepage	1.00 1.00	Very limited Depth to saturated zone Too sandy Seepage	1.00 1.00 1.00
Urban land-----	Not rated		Not rated		Not rated	
19: Peawick-----	Very limited Too clayey Depth to saturated zone	1.00 0.99	Somewhat limited Depth to saturated zone	0.75	Very limited Too clayey Depth to saturated zone	1.00 0.86
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
20: Seabrook-----	Very limited Depth to saturated zone Seepage, bottom layer Too sandy	1.00  1.00  0.50	Very limited Depth to saturated zone Seepage	1.00  1.00	Very limited Seepage Too sandy Depth to saturated zone	1.00 0.50 0.47
Urban land-----	Not rated		Not rated		Not rated	
21A, 21B: Slagle-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Somewhat limited Depth to saturated zone	0.86
Urban land-----	Not rated		Not rated		Not rated	
22: State-----	Very limited Depth to saturated zone Seepage, bottom layer Flooding	1.00  1.00  0.40	Very limited Depth to saturated zone Flooding	1.00  0.40	Not limited	
Urban land-----	Not rated		Not rated		Not rated	
23: Suffolk-----	Very limited Seepage, bottom layer	1.00	Very limited Seepage	1.00	Not limited	
24: Tomotley-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Urban land-----	Not rated		Not rated		Not rated	
25: Uchee-----	Not limited		Very limited Seepage	1.00	Not limited	
26: Udorthents-----	Not rated		Not rated		Not rated	
Dumps-----	Not rated		Not rated		Not rated	
27: Urban land-----	Not rated		Not rated		Not rated	
28: Yemassee-----	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
DAM: Dam-----	Not rated		Not rated		Not rated	
W: Water-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 13.—Construction Materials, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The ratings given for the thickest layer are for the thickest layer above and excluding the bottom layer. The numbers in the value columns range from 0.00 to 0.99. The greater the value, the greater the likelihood that the bottom layer or thickest layer of the soil is a source of sand or gravel. See text for further explanation of ratings in this table)

Map symbol and soil name	Potential source of gravel		Potential source of sand	
	Rating class	Value	Rating class	Value
1: Altavista-----	Poor		Fair	
	Bottom layer	0.00	Thickest layer	0.00
	Thickest layer	0.00	Bottom layer	0.04
Urban land-----	Not rated		Not rated	
2: Augusta-----	Poor		Fair	
	Bottom layer	0.00	Thickest layer	0.00
	Thickest layer	0.00	Bottom layer	0.10
Urban land-----	Not rated		Not rated	
3: Axis-----	Poor		Poor	
	Bottom layer	0.00	Bottom layer	0.00
	Thickest layer	0.00	Thickest layer	0.00
4: Beaches-----	Poor		Fair	
	Bottom layer	0.00	Bottom layer	0.95
	Thickest layer	0.00	Thickest layer	0.95
5: Bethera-----	Poor		Poor	
	Bottom layer	0.00	Bottom layer	0.00
	Thickest layer	0.00	Thickest layer	0.00
Urban land-----	Not rated		Not rated	
6: Bohicket-----	Poor		Poor	
	Bottom layer	0.00	Bottom layer	0.00
	Thickest layer	0.00	Thickest layer	0.00
7: Bojac-----	Poor		Fair	
	Bottom layer	0.00	Thickest layer	0.04
	Thickest layer	0.00	Bottom layer	0.08
Urban land-----	Not rated		Not rated	
8: Chickahominy-----	Poor		Poor	
	Bottom layer	0.00	Bottom layer	0.00
	Thickest layer	0.00	Thickest layer	0.00
Urban land-----	Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand	
	Rating class	Value	Rating class	Value
9A, 9B: Craven-----	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Urban land-----	Not rated		Not rated	
10: Dragston-----	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.00 0.36
Urban land-----	Not rated		Not rated	
11: Duckston-----	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.36 0.86
12: Johnston-----	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.00 0.11
13: Lawnes-----	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.00 0.43
14: Levy-----	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.00 0.03
15: Munden-----	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.00 0.38
Urban land-----	Not rated		Not rated	
16C, 16D: Nevarc-----	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Uchee-----	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
17: Newflat-----	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Urban land-----	Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand	
	Rating class	Value	Rating class	Value
18: Nimmo-----	Poor		Fair	
	Bottom layer	0.00	Thickest layer	0.00
	Thickest layer	0.00	Bottom layer	0.85
Urban land-----	Not rated		Not rated	
19: Peawick-----	Poor		Poor	
	Bottom layer	0.00	Bottom layer	0.00
	Thickest layer	0.00	Thickest layer	0.00
Urban land-----	Not rated		Not rated	
20: Seabrook-----	Poor		Fair	
	Bottom layer	0.00	Thickest layer	0.10
	Thickest layer	0.00	Bottom layer	0.45
Urban land-----	Not rated		Not rated	
21A, 21B: Slagle-----	Poor		Poor	
	Bottom layer	0.00	Bottom layer	0.00
	Thickest layer	0.00	Thickest layer	0.00
Urban land-----	Not rated		Not rated	
22: State-----	Poor		Fair	
	Bottom layer	0.00	Thickest layer	0.00
	Thickest layer	0.00	Bottom layer	0.04
Urban land-----	Not rated		Not rated	
23: Suffolk-----	Poor		Fair	
	Bottom layer	0.00	Thickest layer	0.03
	Thickest layer	0.00	Bottom layer	0.36
24: Tomotley-----	Poor		Fair	
	Bottom layer	0.00	Thickest layer	0.00
	Thickest layer	0.00	Bottom layer	0.11
Urban land-----	Not rated		Not rated	
25: Uchee-----	Poor		Poor	
	Bottom layer	0.00	Bottom layer	0.00
	Thickest layer	0.00	Thickest layer	0.00
26: Udorthents-----	Not rated		Not rated	
Dumps-----	Not rated		Not rated	
27: Urban land-----	Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Potential source of gravel		Potential source of sand	
	Rating class	Value	Rating class	Value
28:				
Yemassee-----	Poor		Poor	
	Bottom layer	0.00	Thickest layer	0.00
	Thickest layer	0.00	Bottom layer	0.00
Urban land-----	Not rated		Not rated	
DAM:				
Dam-----	Not rated		Not rated	
W:				
Water-----	Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 13.—Construction Materials, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1: Altavista-----	Fair Organic matter content low Too acid	0.12  0.20	Fair Low strength Wetness depth	0.22 0.53	Fair Wetness depth Too acid	0.53 0.76
Urban land-----	Not rated		Not rated		Not rated	
2: Augusta-----	Fair Organic matter content low Too acid	0.12  0.50	Fair Wetness depth	0.14	Fair Wetness depth Too acid Hard to reclaim (rock fragments)	0.14 0.68 0.92
Urban land-----	Not rated		Not rated		Not rated	
3: Axis-----	Poor Organic matter content low Sodium content Salinity	0.00  0.00 0.00	Poor Wetness depth	0.00	Poor Wetness depth Sodium content Salinity	0.00 0.00 0.00
4: Beaches-----	Poor Too sandy Wind erosion Droughty	0.00 0.00 0.00	Good		Poor Hard to reclaim (dense layer) Too sandy Salinity	0.00  0.00 0.00
5: Bethera-----	Fair Too clayey Too acid Organic matter content low	0.08 0.50 0.88	Poor Wetness depth Low strength Shrink-swell	0.00 0.00 0.89	Poor Wetness depth Too clayey Too acid	0.00 0.06 0.76
Urban land-----	Not rated		Not rated		Not rated	
6: Bohicket-----	Poor Sodium content Too clayey Salinity	0.00 0.08 0.50	Poor Wetness depth Low strength Shrink-swell	0.00 0.00 0.12	Poor Wetness depth Sodium content Salinity	0.00 0.00 0.00
7: Bojac-----	Poor Wind erosion Organic matter content low Too acid	0.00 0.12 0.50	Good		Good	
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
8: Chickahominy-----	Poor		Poor		Poor	
	Too clayey	0.00	Wetness depth	0.00	Wetness depth	0.00
	Organic matter content low	0.12	Low strength	0.00	Too clayey	0.00
	Too acid	0.50	Shrink-swell	0.12	Too acid	0.24
Urban land-----	Not rated		Not rated		Not rated	
9A, 9B: Craven-----	Poor		Poor		Poor	
	Too clayey	0.00	Low strength	0.00	Too clayey	0.00
	Too acid	0.12	Shrink-swell	0.87	Too acid	0.59
	Organic matter content low	0.12	Wetness depth	0.89	Wetness depth	0.89
Urban land-----	Not rated		Not rated		Not rated	
10: Dragston-----	Fair		Fair		Fair	
	Organic matter content low	0.12	Wetness depth	0.29	Wetness depth	0.29
	Too acid	0.50			Too acid	0.68
Urban land-----	Not rated		Not rated		Not rated	
11: Duckston-----	Poor		Poor		Poor	
	Too sandy	0.00	Wetness depth	0.00	Too sandy	0.00
	Wind erosion	0.00			Wetness depth	0.00
	Organic matter content low	0.00				
12: Johnston-----	Fair		Poor		Poor	
	Too acid	0.50	Wetness depth	0.00	Wetness depth	0.00
					Too acid	0.88
13: Lawnes-----	Fair		Poor		Poor	
	Too acid	0.54	Wetness depth	0.00	Wetness depth	0.00
	Sodium content	0.60			Sodium content	0.60
					Salinity	0.97
14: Levy-----	Poor		Poor		Poor	
	Sodium content	0.00	Wetness depth	0.00	Wetness depth	0.00
	Too acid	0.00	Shrink-swell	0.39	Sodium content	0.00
	Too clayey	0.00			Too clayey	0.00
15: Munden-----	Poor		Fair		Fair	
	Wind erosion	0.00	Wetness depth	0.53	Wetness depth	0.53
	Organic matter content low	0.12			Too acid	0.68
	Too acid	0.50				
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
16C:						
Nevarc-----	Poor		Poor		Poor	
	Too clayey	0.00	Low strength	0.00	Too clayey	0.00
	Too acid	0.01	Wetness depth	0.53	Wetness depth	0.53
	Organic matter content low	0.12	Shrink-swell	0.93	Slope	0.63
Uchee-----	Poor		Good		Poor	
	Wind erosion	0.00			Too sandy	0.00
	Too sandy	0.00			Slope	0.63
	Organic matter content low	0.12			Too acid	0.76
16D:						
Nevarc-----	Poor		Poor		Poor	
	Too clayey	0.00	Slope	0.00	Slope	0.00
	Too acid	0.01	Low strength	0.00	Too clayey	0.00
	Organic matter content low	0.12	Wetness depth	0.53	Wetness depth	0.53
Uchee-----	Poor		Fair		Poor	
	Wind erosion	0.00	Slope	0.50	Slope	0.00
	Too sandy	0.00			Too sandy	0.00
	Organic matter content low	0.12			Too acid	0.76
17:						
Newflat-----	Poor		Poor		Poor	
	Too clayey	0.00	Low strength	0.00	Too clayey	0.00
	Too acid	0.12	Wetness depth	0.00	Wetness depth	0.00
	Organic matter content low	0.12	Shrink-swell	0.12	Too acid	0.59
Urban land-----	Not rated		Not rated		Not rated	
18:						
Nimmo-----	Fair		Poor		Poor	
	Organic matter content low	0.12	Wetness depth	0.00	Wetness depth	0.00
	Too acid	0.50			Too acid	0.59
Urban land-----	Not rated		Not rated		Not rated	
19:						
Peawick-----	Poor		Poor		Poor	
	Too clayey	0.00	Low strength	0.00	Too clayey	0.00
	Organic matter content low	0.12	Shrink-swell	0.12	Too acid	0.24
	Too acid	0.50	Wetness depth	0.53	Wetness depth	0.53
Urban land-----	Not rated		Not rated		Not rated	
20:						
Seabrook-----	Poor		Fair		Fair	
	Wind erosion	0.00	Wetness depth	0.89	Too sandy	0.01
	Too sandy	0.01			Too acid	0.68
	Organic matter content low	0.12			Wetness depth	0.89
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
21A, 21B: Slagle-----	Fair		Poor		Fair	
	Too acid	0.12	Low strength	0.00	Wetness depth	0.53
	Organic matter content low	0.12	Wetness depth	0.53	Too clayey	0.53
	Too clayey	0.92	Shrink-swell	0.87	Too acid	0.59
Urban land-----	Not rated		Not rated		Not rated	
22: State-----	Fair		Good		Fair	
	Organic matter content low	0.12			Too acid	0.98
	Too acid	0.54				
Urban land-----	Not rated		Not rated		Not rated	
23: Suffolk-----	Poor		Good		Fair	
	Wind erosion	0.00			Too acid	0.76
	Organic matter content low	0.12				
	Too acid	0.50				
24: Tomotley-----	Fair		Poor		Poor	
	Too acid	0.01	Wetness depth	0.00	Wetness depth	0.00
	Organic matter content low	0.88	Low strength	0.78	Too acid	0.59
Urban land-----	Not rated		Not rated		Not rated	
25: Uchee-----	Poor		Good		Poor	
	Wind erosion	0.00			Too sandy	0.00
	Too sandy	0.00			Too acid	0.76
	Organic matter content low	0.12				
26: Udorthents-----	Not rated		Not rated		Not rated	
Dumps-----	Not rated		Not rated		Not rated	
27: Urban land-----	Not rated		Not rated		Not rated	
28: Yemassee-----	Fair		Poor		Poor	
	Too acid	0.16	Wetness depth	0.00	Wetness depth	0.00
					Too acid	0.68
Urban land-----	Not rated		Not rated		Not rated	
DAM: Dam-----	Not rated		Not rated		Not rated	
W: Water-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 14.--Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1: Altavista-----	Very limited Seepage	1.00	Very limited Depth to saturated zone Piping Seepage	0.99 0.60 0.04	Very limited Cutbanks cave Depth to saturated zone	1.00 0.01
Urban land-----	Not rated		Not rated		Not rated	
2: Augusta-----	Somewhat limited Seepage	0.70	Very limited Depth to saturated zone Seepage	1.00 0.10	Very limited Cutbanks cave Slow refill	1.00 0.30
Urban land-----	Not rated		Not rated		Not rated	
3: Axis-----	Somewhat limited Seepage	0.70	Very limited Ponding Depth to saturated zone Piping	1.00 1.00 1.00	Very limited Salinity and saturated zone Slow refill Cutbanks cave	1.00 0.30 0.10
4: Beaches-----	Very limited Seepage	1.00	Very limited Salinity Seepage	1.00 0.95	Very limited Depth to water	1.00
5: Bethera-----	Somewhat limited Seepage	0.01	Very limited Depth to saturated zone Ponding	1.00 1.00	Somewhat limited Slow refill Cutbanks cave	0.30 0.10
Urban land-----	Not rated		Not rated		Not rated	
6: Bohicket-----	Not limited		Very limited Organic matter content Ponding Depth to saturated zone	1.00 1.00 1.00	Very limited Slow refill Salinity and saturated zone Cutbanks cave	1.00 0.78 0.10
7: Bojac-----	Very limited Seepage	1.00	Somewhat limited Seepage	0.08	Very limited Depth to water	1.00
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 14.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
8: Chickahominy-----	Not limited		Very limited Depth to saturated zone Hard to pack	1.00 0.76	Somewhat limited Slow refill Cutbanks cave	0.30 0.10
Urban land-----	Not rated		Not rated		Not rated	
9A, 9B: Craven-----	Not limited		Somewhat limited Depth to saturated zone	0.86	Very limited Slow refill Cutbanks cave Depth to saturated zone	1.00 0.10 0.06
Urban land-----	Not rated		Not rated		Not rated	
10: Dragston-----	Very limited Seepage	1.00	Very limited Depth to saturated zone Seepage	1.00 0.36	Very limited Cutbanks cave	1.00
Urban land-----	Not rated		Not rated		Not rated	
11: Duckston-----	Very limited Seepage	1.00	Very limited Depth to saturated zone Seepage	1.00 0.86	Very limited Cutbanks cave	1.00
12: Johnston-----	Very limited Seepage	1.00	Very limited Depth to saturated zone Ponding Seepage	1.00 1.00 0.11	Very limited Cutbanks cave	1.00
13: Lawnes-----	Somewhat limited Seepage	0.70	Very limited Ponding Depth to saturated zone Piping	1.00 1.00 1.00	Very limited Cutbanks cave Slow refill Salinity and saturated zone	1.00 0.30 0.01 1
14: Levy-----	Somewhat limited Seepage	0.70	Very limited Ponding Depth to saturated zone Hard to pack	1.00 1.00 1.00	Somewhat limited Slow refill Cutbanks cave	0.30 0.10
15: Munden-----	Very limited Seepage	1.00	Very limited Depth to saturated zone Seepage	0.99 0.38	Very limited Cutbanks cave Depth to saturated zone	1.00 0.01
Urban land-----	Not rated		Not rated		Not rated	



# Soil Survey of Tidewater Cities Area, Virginia

Table 14.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
16C, 16D: Nevarc-----	Very limited Slope Seepage	1.00 1.00	Very limited Depth to saturated zone	0.99	Very limited Depth to water	1.00
Uchee-----	Very limited Seepage Slope	1.00 1.00	Not limited		Very limited Depth to water	1.00
17: Newflat-----	Not limited		Very limited Depth to saturated zone Hard to pack	1.00 0.63	Very limited Slow refill Cutbanks cave	1.00 0.10
Urban land-----	Not rated		Not rated		Not rated	
18: Nimmo-----	Very limited Seepage	1.00	Very limited Depth to saturated zone Seepage	1.00 0.85	Very limited Cutbanks cave	1.00
Urban land-----	Not rated		Not rated		Not rated	
19: Peawick-----	Not limited		Very limited Depth to saturated zone Hard to pack	0.99 0.60	Very limited Depth to water	1.00
Urban land-----	Not rated		Not rated		Not rated	
20: Seabrook-----	Very limited Seepage	1.00	Somewhat limited Depth to saturated zone Seepage	0.86 0.45	Very limited Cutbanks cave Depth to saturated zone	1.00 0.06
Urban land-----	Not rated		Not rated		Not rated	
21A, 21B: Slagle-----	Somewhat limited Slope Seepage	0.08 0.01	Very limited Depth to saturated zone Piping	0.99 0.03	Somewhat limited Slow refill Cutbanks cave Depth to saturated zone	0.99 0.10 0.01
Urban land-----	Not rated		Not rated		Not rated	
22: State-----	Very limited Seepage	1.00	Somewhat limited Seepage	0.04	Very limited Depth to water	1.00
Urban land-----	Not rated		Not rated		Not rated	
23: Suffolk-----	Very limited Seepage Slope	1.00 0.08	Somewhat limited Seepage	0.36	Very limited Depth to water	1.00



# Soil Survey of Tidewater Cities Area, Virginia

Table 14.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
24: Tomotley-----	Somewhat limited Seepage	0.70	Very limited Depth to saturated zone Seepage	1.00 0.11	Very limited Cutbanks cave Slow refill	1.00 0.30
Urban land-----	Not rated		Not rated		Not rated	
25: Uchee-----	Very limited Seepage Slope	1.00 0.08	Not limited		Very limited Depth to water	1.00
26: Udorthents-----	Not rated		Not rated		Not rated	
Dumps-----	Not rated		Not rated		Not rated	
27: Urban land-----	Not rated		Not rated		Not rated	
28: Yemassee-----	Somewhat limited Seepage	0.70	Very limited Depth to saturated zone Seepage	1.00 0.01	Somewhat limited Cutbanks cave	0.10
Urban land-----	Not rated		Not rated		Not rated	
DAM: Dam-----	Not rated		Not rated		Not rated	
W: Water-----	Not rated		Not rated		Not rated	



Table 15.—Engineering Properties

(Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1: Altavista-----	0-11	Fine sandy loam, sandy loam, loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0	0	95-100	90-100	55-95	27-75	21-40	6-16
	11-62	Loam, clay loam, sandy clay loam, fine sandy loam	CL, SC, SC-SM	A-6, A-7	0	0	95-100	90-100	65-100	35-80	27-44	12-25
	62-74	Stratified fine sandy loam to loamy fine sand to fine sand, sandy loam, fine sandy loam, sand, gravelly sandy loam	CL, CL-ML, SC, SC-SM	A-2-4, A-4, A-6	0	0	90-100	50-100	25-85	2-55	16-32	2-13
Urban land.												
2: Augusta-----	0-13	Sandy loam, fine sandy loam, loam	ML, SC-SM, SM	A-2-4, A-4	0	0	90-100	90-100	55-95	27-75	17-35	2-13
	13-27	Sandy clay loam, clay loam, loam	CL	A-6, A-7	0	0	90-100	90-100	75-100	32-80	29-44	13-25
	27-72	Gravelly loamy sand, sandy loam, loam, sandy clay loam, clay loam, stratified loamy sand to gravelly loamy sand	SC-SM, SW-SC, CL	A-1-b, A-2-4, A-4, A-6	0	0	80-100	70-100	35-100	10-80	16-40	2-21
Urban land.												
3: Axis-----	0-14	Very fine sandy loam, mucky very fine sandy loam, mucky silt loam, sandy loam	ML, CL-ML, SC-SM, SM	A-4	0	0	100	100	60-100	30-90	14-25	1-7
	14-70	Fine sandy loam, sandy loam, very fine sandy loam, loam	CL-ML, SC-SM	A-4	0	0	100	100	60-95	30-75	14-20	1-4
4: Beaches-----	0-60	Sand, coarse sand, fine sand	SP	A-1, A-3	0	0	80-100	78-100	39-80	4-35	7-9	NP



Table 15.—Engineering Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
5: Bethera-----	0-12	Silt loam, loam, fine sandy loam	CL	A-4, A-6	0	0	100	100	70-100	40-90	22-43	6-13
	12-72	Clay loam, clay, sandy clay, silty clay, silty clay loam	CH, CL	A-7-6	0	0	100	100	85-100	45-95	44-60	25-36
Urban land.												
6: Bohicket-----	0-8	Silty clay loam, muck, silty clay, clay	OH, CH, MH	A-7-5	0	0	100	100	90-100	75-95	51-116	21-40
	8-29	Silty clay loam, silty clay, clay, clay loam, sandy clay, mucky silty clay loam	OH, CH, MH	A-7-5	0	0	100	100	85-100	45-95	55-107	25-41
	29-65	Silty clay, sand, clay, mucky silty clay	MH, OH	A-7-5	0	0	100	100	50-100	5-95	0-107	NP-41
7: Bojac-----	0-10	Loamy fine sand, sandy loam, fine sandy loam	SC-SM, SM	A-4, A-2-4	0	0	95-100	90-100	45-85	15-55	0-22	NP-4
	10-35	Sandy loam, fine sandy loam, loam, sandy clay loam, clay loam	CL, SC	A-2-4, A-4	0	0	95-100	90-100	55-100	27-80	21-38	6-19
	35-70	Loamy sand, loamy fine sand, coarse sand, stratified coarse sand to loamy fine sand	SC-SM, SM, SP, SW-SM	A-1, A-2-4, A-3	0	0	90-100	80-100	40-85	4-45	0-21	NP-4
Urban land.												
8: Chickahominy----	0-5	Loam, silt loam, very fine sandy loam	CL, CL-ML, SC	A-4	0	0	98-100	95-100	81-100	48-90	21-39	6-17
	5-64	Clay, silty clay, clay loam, silty clay loam	CH, CL	A-7-6	0	0	98-100	95-100	72-100	56-95	45-69	25-44
Urban land.												



Table 15.—Engineering Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
9A: Craven-----	0-10	Loam, silt loam, fine sandy loam	CL, ML, SC, SM	A-4, A-6	0	0	100	95-100	70-100	38-90	19-41	3-19
	10-45	Clay, silty clay, silty clay loam, clay loam	CH, CL	A-7-6	0	0	100	95-100	86-100	66-95	43-63	25-40
	45-70	Clay loam, clay, silty clay loam, silty clay, sandy clay loam, sandy clay	CH, CL	A-7-6, A-6	0	0	100	95-100	75-100	35-95	35-63	17-40
Urban land.												
9B: Craven-----	0-10	Loam, silt loam, fine sandy loam	CL, ML, SC, SM	A-4, A-6	0	0	100	95-100	70-100	38-90	19-41	3-19
	10-45	Clay, silty clay, silty clay loam, clay loam	CH, CL	A-7-6	0	0	100	95-100	86-100	66-95	43-63	25-40
	45-70	Clay loam, clay, silty clay loam, silty clay, sandy clay loam, sandy clay	CH, CL	A-7-6, A-6	0	0	100	95-100	75-100	35-95	35-63	17-40
Urban land.												
10: Dragston-----	0-4	Fine sandy loam, sandy loam, loamy sand, loam, loamy fine sand	CL-ML, SC-SM, SM	A-2-4, A-4	0	0	100	95-100	50-95	15-75	17-28	1-7
	4-25	Fine sandy loam, sandy loam, loam, loamy sand, loamy fine sand	CL, CL-ML, SC, SC-SM	A-2-4, A-4	0	0	100	95-100	50-95	15-75	0-30	NP-12
	25-75	Sand, fine sand, loamy sand, loamy fine sand, sandy loam	SC-SM, SM, SP-SM	A-1, A-2-4, A-3	0	0	95-100	85-100	45-85	5-55	0-25	NP-7
Urban land.												
11: Duckston-----	0-4	Fine sand	SM	A-2	0	0	100	95-100	62-80	20-35	7-11	NP
	4-60	Sand, fine sand	SP-SM	A-2, A-3	0	0	100	95-100	48-80	5-33	7-11	NP
12: Johnston-----	0-24	Mucky silt loam, loam, sandy loam	CL-ML, ML, OL	A-4, A-5, A-6	0	0	100	100	60-95	30-75	20-45	2-14
	24-30	Sandy loam, loam, fine sandy loam, loamy sand	SM, SC-SM	A-2-4, A-4	0	0	100	100	50-95	15-75	10-30	NP-5
	30-64	Loamy sand, stratified sand to sandy clay loam	SM	A-2-4, A-4	0	0	100	100	50-95	5-75	15-35	NP-10



Table 15.—Engineering Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
13: Lawnes-----	0-13	Muck, mucky loam, sandy loam, fine sandy loam, loam, silt loam	PT	A-8	0	0	100	100	60-100	30-100	---	---
	13-55	Loam, sandy loam, stratified sand to mucky silty clay loam, muck	CL, CL-ML, ML, SC	A-2-4, A-4	0	0	100	100	50-95	5-75	17-56	2-20
	55-62	Sand, stratified sand to mucky silty clay loam, muck	SP-SC, PT, CL, CL-ML, ML, SC	A-2-4, A-4	0	0	100	100	50-95	3-75	0-70	NP-20
14: Levy-----	0-20	Mucky clay, clay, mucky silty clay, mucky silty clay loam, mucky silt loam	MH	A-7	0	0	100	100	90-100	75-95	58-103	17-37
	20-40	Mucky silty clay, mucky clay, silty clay	MH	A-7-6	0	0	100	100	90-100	75-95	55-97	25-42
	40-80	Stratified mucky sandy loam to sandy loam, sandy loam, mucky sandy loam, sand, clay	ML, SC-SM, CH	A-2-7, A-4, A-6	0	0	100	100	50-100	5-95	27-97	2-42
15: Munden-----	0-6	Loamy sand, loamy fine sand, sandy loam, fine sandy loam, loam	SC-SM, SM	A-2-4, A-4	0	0	100	90-100	45-95	15-75	0-24	NP-6
	6-38	Fine sandy loam, sandy loam, loam	SC, SC-SM	A-2-4, A-4, A-6	0	0	100	90-100	55-85	30-55	18-30	4-12
	38-74	Sand, loamy sand, loamy coarse sand, loamy fine sand, fine sand, fine sandy loam, sandy loam	SC-SM, SM, SP-SM	A-2-4, A-3	0	0	100	90-100	45-85	5-55	0-25	NP-7
Urban land.												
16C: Nevarc-----	0-11	Sandy loam, fine sandy loam, loam, very fine sandy loam, silt loam	SC-SM, SC	A-2-4, A-4	0	0	98-100	95-100	60-100	30-90	20-33	4-12
	11-54	Clay, sandy clay, silty clay, clay loam, sandy clay loam, silty clay loam	CH, CL	A-7	0	0	98-100	95-100	76-100	35-95	43-63	24-40
	54-72	Fine sandy loam, sandy loam, loamy sand, sand, stratified sand to clay	CL, ML, SC, SM	A-2-4, A-4, A-6	0	0	98-100	95-100	50-100	5-95	16-53	2-32



Table 15.—Engineering Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
16C: Uchee-----	0-4	Loamy fine sand, loamy sand, sand	SC-SM, SM	A-1-b, A-2-4	0	0	90-100	80-100	40-75	5-30	0-29	NP-6
	4-26	Loamy sand, sand	SC-SM, SM	A-1-b, A-2-4	0	0	90-100	80-100	40-75	5-30	0-29	NP-6
	26-50	Sandy clay loam, sandy loam, sandy clay, clay, loamy sand	SC, SC-SM	A-2-4, A-4, A-6	0	0	90-100	80-100	40-95	12-60	15-49	1-28
	50-72	Sandy clay loam, sandy loam, clay, sandy clay	CL, SC	A-7, A-6, A-4	0	0	90-100	80-100	50-100	25-95	26-59	10-36
16D: Nevarc-----	0-11	Sandy loam, fine sandy loam, loam, very fine sandy loam, silt loam	SC-SM, SC	A-2-4, A-4	0	0	98-100	95-100	60-100	30-90	20-33	4-12
	11-54	Clay, sandy clay, silty clay, clay loam, sandy clay loam, silty clay loam	CH, CL	A-7	0	0	98-100	95-100	76-100	35-95	43-63	24-40
	54-72	Fine sandy loam, sandy loam, loamy sand, sand, stratified sand to clay	CL, ML, SC, SM	A-2-4, A-4, A-6	0	0	98-100	95-100	50-100	5-95	16-53	2-32
Uchee-----	0-4	Loamy fine sand, loamy sand, sand	SC-SM, SM	A-1-b, A-2-4	0	0	90-100	80-100	40-75	5-30	0-29	NP-6
	4-26	Loamy sand, sand	SC-SM, SM	A-1-b, A-2-4	0	0	90-100	80-100	40-75	5-30	0-29	NP-6
	26-50	Sandy clay loam, sandy loam, sandy clay, clay, loamy sand	SC, SC-SM	A-2-4, A-4, A-6	0	0	90-100	80-100	40-95	12-60	15-49	1-28
	50-72	Sandy clay loam, sandy loam, clay, sandy clay	CL, SC	A-7, A-6, A-4	0	0	90-100	80-100	50-100	25-95	26-59	10-36
17: Newflat-----	0-6	Silt loam, loam, very fine sandy loam	ML, CL-ML	A-4	0	0	100	100	82-100	58-90	21-41	6-17
	6-55	Silty clay, clay, silty clay loam, clay loam	CH, CL	A-7-6	0	0	100	100	86-100	66-95	45-69	25-44
	55-64	Clay loam, clay, silty clay loam, silty clay	CH, CL	A-7-6	0	0	100	100	86-100	66-95	41-69	21-44
Urban land.												



Table 15.—Engineering Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
18: Nimmo-----	0-14	Sandy loam, fine sandy loam, loamy fine sand, loamy sand	ML, SC, SC-SM, SM	A-2-4, A-4	0	0	100	95-100	50-85	15-55	17-32	1-9
	14-32	Fine sandy loam, sandy loam, loam	CL, SC	A-2-4, A-4	0	0	100	95-100	60-95	30-75	18-30	4-12
	32-64	Coarse sand, loamy sand, loamy fine sand, sand, fine sand, gravelly sand	SC-SM, SM, SP-SM	A-2-4, A-3	0	0	100	70-100	35-85	5-45	0-21	NP-4
Urban land.												
19: Peawick-----	0-5	Silt loam, loam	CL, CL-ML	A-4	0	0	98-100	95-100	80-100	55-90	21-39	6-17
	5-36	Silty clay, clay, silty clay loam, clay loam	CH, CL	A-7-6	0	0	98-100	95-100	85-100	65-95	45-69	25-44
	36-64	Clay, silty clay, silty clay loam, clay loam	CH, CL	A-7-6	0	0	98-100	95-100	85-100	65-95	45-69	25-44
Urban land.												
20: Seabrook-----	0-9	Loamy sand, loamy fine sand, fine sand	SM, SC-SM	A-2-4	0	0	100	100	45-85	15-45	0-28	NP-7
	9-60	Loamy sand, loamy fine sand, fine sand, sand, loamy coarse sand	SM, SC-SM	A-2-4, A-3	0	0	100	100	50-85	5-45	0-25	NP-7
	60-80	Gravelly sand, sand, loamy sand, loamy fine sand, fine sand, loamy coarse sand	SM, SC-SM, SW	A-2-4, A-3, A-1-b	0	0	70-100	50-100	25-85	2-45	0-25	NP-7
Urban land.												
21A: Slagle-----	0-10	Fine sandy loam, sandy loam, loam	CL, SC, SC-SM	A-2-4, A-4	0	0-2	95-100	92-100	55-95	28-75	20-33	4-12
	10-44	Sandy clay loam, loam, clay loam, fine sandy loam	CL, SC	A-7, A-6	0	0-2	95-100	92-100	65-100	40-80	29-50	12-29
	44-63	Sandy clay loam, loam, clay loam, fine sandy loam	CL, SC	A-6, A-7	0	0-2	95-100	92-100	65-100	40-95	29-50	12-29
Urban land.												



Table 15.—Engineering Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
21B: Slagle-----	0-10	Fine sandy loam, sandy loam, loam	CL, SC, SC-SM	A-2-4, A-4	0	0-2	95-100	92-100	55-95	28-75	20-33	4-12
	10-44	Sandy clay loam, loam, clay loam, fine sandy loam	CL, SC	A-6, A-7	0	0-2	95-100	92-100	65-100	40-80	29-50	12-29
	44-63	Sandy clay loam, loam, clay loam, fine sandy loam	CL, SC	A-6, A-7	0	0-2	95-100	92-100	65-100	40-95	29-50	12-29
Urban land.												
22: State-----	0-10	Fine sandy loam, sandy loam, loam, loamy sand	CL-ML, CL, SC-SM, SC	A-2-4, A-4	0	0	98-100	96-100	48-95	14-75	17-31	2-10
	10-56	Sandy clay loam, clay loam, loam, sandy loam	CL, SC	A-6	0	0	98-100	96-100	57-100	28-80	27-43	12-24
	56-84	Sandy loam, loamy sand, sand, gravelly sand	SC-SM, SC, SP-SM	A-1-b, A-2-4, A-3, A-4	0	0	85-100	62-100	30-75	3-40	0-27	NP-10
Urban land.												
23: Suffolk-----	0-10	Loamy sand, sandy loam, fine sandy loam	SC-SM, SM	A-1-b, A-2-4, A-4	0	0	95-100	92-100	45-85	15-55	16-24	1-6
	10-38	Sandy loam, fine sandy loam, loam, sandy clay loam	CL, SC	A-4, A-2-4, A-6	0	0	95-100	92-100	55-95	25-75	20-43	6-23
	38-65	Sand, fine sand, loamy sand, fine sand, loamy sand, gravelly sand	SC-SM, SM, SP, SP-SC	A-1-b, A-2-4, A-4	0	0	75-100	55-100	30-85	3-45	15-22	1-6
24: Tomotley-----	0-4	Fine sandy loam, loam, loamy fine sand, loamy sand	SC-SM, SM	A-2-4, A-4	0	0	98-100	92-100	45-85	15-55	18-43	2-13
	4-15	Fine sandy loam, sandy clay loam, clay loam, loam	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	0	0	98-100	92-100	65-100	38-80	20-44	6-25
	15-65	Sandy clay loam, fine sandy loam, clay loam, loam	CL, SC, SC-SM	A-6	0	0	98-100	92-100	65-100	38-80	28-45	12-25
	65-75	Loamy sand, stratified sand to clay		A-4, A-6, A-7, A-2-4, A-3	0	0	100	100	50-100	5-95	0-57	NP-36
Urban land.												



Table 15.—Engineering Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
25: Uchee-----	0-4	Loamy fine sand, loamy sand, sand	SC-SM, SM	A-1-b, A-2-4	0	0	90-100	80-100	40-75	5-30	0-29	NP-6
	4-26	Loamy sand, sand	SC-SM, SM	A-1-b, A-2-4	0	0	90-100	80-100	40-75	5-30	0-29	NP-6
	26-50	Sandy clay loam, sandy loam, sandy clay, clay, loamy sand	SC, SC-SM	A-2-4, A-4, A-6	0	0	90-100	80-100	40-95	12-60	15-49	1-28
	50-72	Sandy clay loam, sandy loam, clay, sandy clay	CL, SC	A-7, A-6, A-4	0	0	90-100	80-100	50-100	25-95	26-59	10-36
26. Udorthents-Dumps												
27. Urban land												
28: Yemassee-----	0-15	Fine sandy loam, sandy loam, loamy fine sand, loamy sand	SC, SC-SM	A-2-4, A-4	0	0	100	100	50-85	15-55	21-39	6-13
	15-40	Sandy clay loam, clay loam, fine sandy loam, sandy loam	CL, SC, SC-SM	A-6, A-7	0	0	100	100	60-100	30-80	27-47	12-24
	40-60	Sandy loam, sandy clay loam, clay loam	CL-ML, SC, SC-SM, CL	A-2-4, A-4, A-6	0	0	100	100	60-100	30-80	22-49	7-28
Urban land.												
DAM. Dam												
W. Water												



Table 16.--Physical Soil Properties

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
										Kw	Kf	T		
1:	In	Pct	Pct	Pct	g/cc	um/sec	In/in	Pct	Pct					
Altavista-----	0-11	25-80	10-45	10-24	1.30-1.50	14.00-42.00	0.12-0.20	0.0-2.9	0.5-3.0	.24	.24	5	3	86
	11-62	20-80	5-45	18-35	1.30-1.50	4.00-14.00	0.12-0.20	0.0-2.9	0.0-0.5	.24	.24			
	62-74	50-95	2-25	5-20	1.40-1.70	4.00-142.00	0.05-0.15	0.0-2.9	0.0-0.5	.24	.24			
Urban land.														
2:														
Augusta-----	0-13	25-80	10-45	5-20	1.40-1.70	14.00-42.00	0.10-0.15	0.0-2.9	0.5-2.0	.20	.20	4	3	86
	13-27	20-75	10-45	20-35	1.35-1.60	4.00-14.00	0.12-0.18	0.0-2.9	0.0-0.5	.24	.24			
	27-72	25-85	5-45	5-30	1.40-1.70	4.00-14.00	0.05-0.15	0.0-2.9	0.0-0.5	.05	.10			
Urban land.														
3:														
Axis-----	0-14	---	---	8-20	1.20-1.40	4.00-14.00	0.08-0.15	0.0-2.9	4.0-8.0	.24	.24	5	8	0
	14-70	---	---	8-15	1.30-1.50	4.00-14.00	0.08-0.15	0.0-2.9	0.0-0.0	.10	.10			
4:														
Beaches-----	0-60	---	---	0-2	1.35-1.85	141.00- 141.00	0.03-0.05	0.0-2.9	0.0-0.1	.05	.05	5	1	310
5:														
Bethera-----	0-12	15-80	5-75	10-20	1.20-1.40	4.00-14.00	0.11-0.16	0.0-2.9	1.0-6.0	.28	.28	5	5	56
	12-72	5-60	5-65	35-50	1.30-1.50	0.42-4.00	0.14-0.18	3.0-5.9	0.5-1.0	.32	.32			
Urban land.														
6:														
Bohicket-----	0-8	1-40	10-65	30-60	1.20-1.40	0.42-1.40	0.12-0.32	6.0-8.9	5.0-25	.28	.28	5	8	0
	8-29	1-55	10-65	35-60	1.30-1.60	0.01-0.42	0.10-0.28	6.0-8.9	5.0-20	.28	.28			
	29-65	1-90	5-65	2-60	1.30-1.60	0.01-141.00	0.02-0.28	6.0-8.9	5.0-20	.15	.15			
7:														
Bojac-----	0-10	50-88	5-45	3-8	1.20-1.50	42.00-141.00	0.05-0.10	0.0-2.9	0.5-1.0	.17	.17	3	2	134
	10-35	25-80	5-45	11-28	1.35-1.55	14.00-42.00	0.08-0.16	0.0-2.9	0.0-0.5	.17	.17			
	35-70	75-98	2-25	1-8	1.30-1.50	42.00-141.00	0.02-0.07	0.0-2.9	0.0-0.5	.17	.17			
Urban land.														



Table 16.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	Pct	Pct	Kw	Kf	T		
8: Chickahominy-----	0-5 5-64	10-75 5-40	10-75 30-60	10-25 35-60	1.20-1.30 1.30-1.50	4.00-14.00 0.01-0.42	0.10-0.17 0.10-0.19	0.0-2.9 6.0-8.9	0.5-2.0 0.0-0.5	.37 .24	.37 .24	4	3	86
Urban land.														
9A: Craven-----	0-10 10-45 45-70	10-80 5-40 5-75	5-75 20-60 5-60	7-27 35-55 25-55	1.30-1.45 1.30-1.45 1.30-1.45	1.40-14.00 0.42-1.40 0.42-1.40	0.12-0.15 0.12-0.15 0.12-0.15	0.0-2.9 3.0-5.9 3.0-5.9	0.5-2.0 0.0-0.5 0.0-0.5	.32 .32 .32	.32 .32 .32	5	5	56
Urban land.														
9B: Craven-----	0-10 10-45 45-70	10-80 5-40 5-75	5-75 20-60 5-60	7-27 35-55 25-55	1.30-1.45 1.30-1.45 1.30-1.45	1.40-14.00 0.42-1.40 0.42-1.40	0.12-0.15 0.12-0.15 0.12-0.15	0.0-2.9 3.0-5.9 3.0-5.9	0.5-2.0 0.0-0.5 0.0-0.5	.32 .32 .32	.32 .32 .32	5	5	56
Urban land.														
10: Dragston-----	0-4 4-25 25-75	30-88 30-88 50-99	3-45 3-45 1-45	4-12 3-18 2-12	1.20-1.50 1.25-1.45 1.35-1.55	14.00-42.00 14.00-42.00 42.00-141.00	0.08-0.15 0.08-0.16 0.04-0.10	0.0-2.9 0.0-2.9 0.0-2.9	1.0-2.0 0.0-0.5 0.0-0.5	.20 .17 .17	.20 .17 .17	4	3	86
Urban land.														
11: Duckston-----	0-4 4-60	--- ---	--- ---	0-4 0-4	1.60-1.70 1.60-1.70	141.00- 141.00 141.00- 141.00	0.02-0.08 0.02-0.05	0.0-2.9 0.0-2.9	0.5-3.0 0.0-0.0	.10 .10	.10 .10	5	1	180
12: Johnston-----	0-24 24-30 30-64	32-85 32-91 45-95	5-65 5-50 3-29	7-18 2-12 5-20	1.25-1.45 1.55-1.65 1.45-1.65	14.00-42.00 42.00-141.00 42.00-141.00	0.20-0.26 0.02-0.07 0.06-0.12	0.0-2.9 0.0-2.9 0.0-2.9	3.0-15 0.5-3.0 0.0-2.0	.17 .17 .17	.17 .17 .17	5	5	56
13: Lawnes-----	0-13 13-55 55-62	15-80 5-98 5-99	5-75 2-75 1-75	5-20 5-30 2-30	0.20-1.20 1.15-1.40 1.15-1.40	4.00-14.00 4.00-14.00 4.00-14.00	0.15-0.26 0.05-0.22 0.05-0.22	0.0-2.9 0.0-2.9 0.0-2.9	20-60 0.5-8.0 0.5-15	.24 .28 .28	.24 .28 .28	5	8	0
14: Levy-----	0-20 20-40 40-80	2-45 0-40 15-98	5-80 10-60 0-45	25-55 40-60 2-60	0.50-1.00 0.50-1.10 1.15-1.35	0.21-1.40 0.21-1.40 4.00-14.00	0.16-0.22 0.16-0.22 0.15-0.22	6.0-8.9 6.0-8.9 0.0-9.0	10-20 5.0-15 5.0-15	.20 .17 .24	.20 .17 .24	5	8	0



Table 16.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	Pct	Pct					
15:														
Munden-----	0-6	40-88	2-40	3-10	1.20-1.35	14.00-42.00	0.06-0.10	0.0-2.9	0.5-1.0	.17	.17	5	2	134
	6-38	40-80	5-40	8-18	1.20-1.35	4.00-42.00	0.08-0.18	0.0-2.9	0.0-0.5	.17	.17			
	38-74	55-99	1-35	2-12	1.35-1.55	14.00-141.00	0.04-0.08	0.0-2.9	0.0-0.5	.17	.17			
Urban land.														
16C:														
Nevarc-----	0-11	10-80	5-75	8-18	1.30-1.50	14.00-42.00	0.08-0.12	0.0-2.9	0.5-2.0	.32	.32	4	3	86
	11-54	5-70	5-60	34-55	1.30-1.50	0.42-1.40	0.10-0.17	3.0-5.9	0.0-0.5	.24	.24			
	54-72	20-99	1-45	5-45	1.30-1.50	4.00-42.00	0.06-0.12	0.0-2.9	0.0-0.5	.20	.24			
Uchee-----	0-4	75-99	1-25	3-10	1.30-1.70	42.00-141.00	0.05-0.10	0.0-2.9	0.2-3.0	.10	.10	5	2	134
	4-26	75-99	1-25	3-10	1.30-1.70	42.00-141.00	0.05-0.10	0.0-2.9	0.2-3.0	.10	.10			
	26-50	25-85	5-45	4-40	1.40-1.60	4.00-141.00	0.05-0.15	0.0-2.9	0.0-0.5	.24	.24			
	50-72	25-80	5-45	15-50	1.40-1.60	1.40-4.00	0.10-0.16	3.0-5.9	0.0-0.5	.28	.28			
16D:														
Nevarc-----	0-11	10-80	5-75	8-18	1.30-1.50	14.00-42.00	0.08-0.12	0.0-2.9	0.5-2.0	.32	.32	4	3	86
	11-54	5-70	5-60	34-55	1.30-1.50	0.42-1.40	0.10-0.17	3.0-5.9	0.0-0.5	.24	.24			
	54-72	20-99	1-45	5-45	1.30-1.50	4.00-42.00	0.06-0.12	0.0-2.9	0.0-0.5	.20	.24			
Uchee-----	0-4	75-99	1-25	3-10	1.30-1.70	42.00-141.00	0.05-0.10	0.0-2.9	0.2-3.0	.10	.10	5	2	134
	4-26	75-99	1-25	3-10	1.30-1.70	42.00-141.00	0.05-0.10	0.0-2.9	0.2-3.0	.10	.10			
	26-50	25-85	5-45	4-40	1.40-1.60	4.00-141.00	0.05-0.15	0.0-2.9	0.0-0.5	.24	.24			
	50-72	25-80	5-45	15-50	1.40-1.60	1.40-4.00	0.10-0.16	3.0-5.9	0.0-0.5	.28	.28			
17:														
Newflat-----	0-6	10-65	10-75	10-25	1.20-1.30	4.00-14.00	0.10-0.17	0.0-2.9	0.5-3.0	.37	.37	4	3	86
	6-55	2-35	20-65	35-60	1.30-1.50	0.01-0.42	0.10-0.19	6.0-8.9	0.0-0.5	.24	.24			
	55-64	2-45	15-65	30-60	1.30-1.50	0.01-2.00	0.10-0.19	6.0-8.9	0.0-0.5	.24	.24			
Urban land.														
18:														
Nimmo-----	0-14	55-88	3-40	4-14	1.20-1.35	14.00-42.00	0.08-0.16	0.0-2.9	1.0-3.0	.20	.20	5	4	86
	14-32	35-75	5-45	8-18	1.20-1.35	4.00-14.00	0.08-0.18	0.0-2.9	0.0-0.5	.17	.17			
	32-64	80-100	0-20	1-8	1.35-1.55	14.00-141.00	0.04-0.08	0.0-2.9	0.0-0.5	.17	.17			
Urban land.														
19:														
Peawick-----	0-5	5-45	40-75	10-25	1.20-1.30	4.00-14.00	0.10-0.17	0.0-2.9	0.5-2.0	.37	.37	4	3	86
	5-36	2-40	25-60	35-60	1.30-1.50	0.01-0.42	0.10-0.17	6.0-8.9	0.0-0.5	.24	.24			
	36-64	2-40	25-60	35-60	1.30-1.50	0.01-0.42	0.10-0.17	6.0-8.9	0.0-0.5	.24	.24			
Urban land.														



Table 16.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	Pct	Pct					
20: Seabrook-----	0-9	70-98	2-20	2-12	1.30-1.60	42.00-141.00	0.05-0.11	0.0-2.9	0.5-2.0	.10	.10	5	2	134
	9-60	75-99	1-25	2-12	1.30-1.60	42.00-141.00	0.02-0.09	0.0-2.9	0.0-0.5	.10	.10			
	60-80	75- 100	0-25	2-12	1.30-1.60	42.00-141.00	0.02-0.09	0.0-2.9	0.0-0.5	.10	.10			
Urban land.														
21A: Slagle-----	0-10	35-80	5-40	8-18	1.30-1.45	14.00-42.00	0.10-0.14	0.0-2.9	0.5-2.0	.28	.28	5	3	86
	10-44	25-80	5-45	18-40	1.35-1.60	0.42-4.00	0.12-0.18	3.0-5.9	0.0-0.5	.24	.24			
	44-63	25-80	5-45	18-40	1.35-1.60	0.42-4.00	0.10-0.18	3.0-5.9	0.0-0.5	.24	.24			
Urban land.														
21B: Slagle-----	0-10	35-80	5-40	8-18	1.30-1.45	14.00-42.00	0.10-0.14	0.0-2.9	0.5-2.0	.28	.28	5	3	86
	10-44	25-80	5-45	18-40	1.35-1.60	0.42-4.00	0.12-0.18	3.0-5.9	0.0-0.5	.24	.24			
	44-63	25-80	5-45	18-40	1.35-1.60	0.42-4.00	0.10-0.18	3.0-5.9	0.0-0.5	.24	.24			
Urban land.														
22: State-----	0-10	30-88	5-45	5-15	1.25-1.40	4.00-42.00	0.08-0.15	0.0-2.9	0.5-2.0	.28	.28	5	3	86
	10-56	25-75	5-45	18-34	1.35-1.50	4.00-14.00	0.14-0.19	0.0-2.9	0.0-0.5	.28	.28			
	56-84	50-98	1-40	2-15	1.35-1.50	14.00-141.00	0.02-0.10	0.0-2.9	0.0-0.2	.17	.17			
Urban land.														
23: Suffolk-----	0-10	60-88	0-25	4-10	1.40-1.50	14.00-141.00	0.05-0.10	0.0-2.9	0.5-1.0	.10	.10	5	2	134
	10-38	30-80	2-30	10-33	1.40-1.50	4.00-14.00	0.10-0.15	0.0-2.9	0.0-0.5	.24	.24			
	38-65	72-99	0-25	4-10	1.40-1.50	14.00-141.00	0.04-0.10	0.0-2.9	0.0-0.2	.10	.10			
24: Tomotley-----	0-4	45-88	3-40	5-20	1.30-1.60	14.00-42.00	0.10-0.15	0.0-2.9	1.0-6.0	.20	.20	5	3	86
	4-15	25-75	5-50	10-35	1.30-1.60	1.40-14.00	0.12-0.18	0.0-2.9	0.0-0.5	.20	.20			
	15-65	25-75	5-50	18-35	1.30-1.50	4.00-14.00	0.12-0.18	0.0-2.9	0.5-1.0	.20	.20			
	65-75	25-99	1-45	2-50	1.30-1.70	1.40-14.00	0.05-0.15	0.0-2.9	0.0-0.5	.10	.10			
Urban land.														
25: Uchee-----	0-4	75-99	1-25	3-10	1.30-1.70	42.00-141.00	0.05-0.10	0.0-2.9	0.2-3.0	.10	.10	5	2	134
	4-26	75-99	1-25	3-10	1.30-1.70	42.00-141.00	0.05-0.10	0.0-2.9	0.2-3.0	.10	.10			
	26-50	25-85	5-45	4-40	1.40-1.60	4.00-141.00	0.05-0.15	0.0-2.9	0.0-0.5	.24	.24			
	50-72	25-80	5-45	15-50	1.40-1.60	1.40-4.00	0.10-0.16	3.0-5.9	0.0-0.5	.28	.28			



Table 16.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
										Kw	Kf	T		
	<u>In</u>	<u>Pct</u>	<u>Pct</u>	<u>Pct</u>	<u>g/cc</u>	<u>um/sec</u>	<u>In/in</u>	<u>Pct</u>	<u>Pct</u>					
26. Udorthents-Dumps														
27. Urban land														
28: Yemassee-----	0-15	55-88	1-30	10-20	1.30-1.60	14.00-42.00	0.10-0.15	0.0-2.9	0.5-4.0	.24	.24	5	3	86
	15-40	30-80	5-30	18-35	1.30-1.50	4.00-14.00	0.11-0.18	0.0-2.9	0.0-2.0	.15	.15			
	40-60	25-80	5-35	12-40	1.30-1.50	4.00-14.00	0.11-0.17	0.0-2.9	0.0-0.5	.24	.24			
Urban land.														
DAM. Dam														
W. Water														



# Soil Survey of Tidewater Cities Area, Virginia

Table 17.—Chemical Soil Properties

(Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Cation- exchange capacity	Effective cation- exchange capacity	Soil reaction	Salinity	Sodium adsorp- tion ratio
	Inches	meq/100 g	meq/100 g	pH	mmhos/cm	
1: Altavista-----	0-11	4.6-15	3.5-11	4.0-6.5	0	0
	11-62	6.3-13	4.7-10	4.0-6.0	0	0
	62-74	1.8-8.1	1.3-6.1	4.0-6.0	0	0
Urban land.						
2: Augusta-----	0-13	2.9-12	2.2-8.6	4.5-6.0	0	0
	13-27	7.0-13	5.2-10	4.5-6.0	0	0
	27-72	1.8-8.6	1.3-6.5	4.5-6.0	0	0
Urban land.						
3: Axis-----	0-14	11-23	8.3-17	6.1-8.4	7.0-775.0	28-66
	14-70	2.0-3.8	1.5-2.8	6.1-8.4	4.0-113.0	12-56
4: Beaches-----	0-60	0.0-0.1	0.0-0.1	5.1-7.8	4.0-32.0	---
5: Bethera-----	0-12	5.8-20	4.3-15	4.0-6.0	0	0
	12-72	13-20	10-15	4.0-6.0	0	0
Urban land.						
6: Bohicket-----	0-8	22-77	16-58	6.1-8.4	8.0-16.0	40-55
	8-29	24-66	18-50	6.1-8.4	8.0-16.0	45-55
	29-65	12-66	9.0-50	6.1-8.4	8.0-16.0	45-55
7: Bojac-----	0-10	2.2-5.0	1.6-3.8	4.0-6.5	0	0
	10-35	3.9-8.1	2.9-6.3	4.0-6.5	0	0
	35-70	0.3-3.9	0.3-2.9	4.0-6.5	0	0
Urban land.						
8: Chickahominy-----	0-5	4.6-13	3.5-9.9	4.0-5.5	0	0
	5-64	12-22	9.2-17	4.0-5.5	0	0
Urban land.						
9A, 9B: Craven-----	0-10	2.9-11	2.2-8.4	4.0-6.5	0	0
	10-45	8.8-16	6.6-12	4.0-5.5	0	0
	45-70	6.2-15	4.7-11	4.0-5.5	0	0
Urban land.						
10: Dragston-----	0-4	3.6-8.7	2.7-6.5	4.5-5.5	0	0
	4-25	3.5-7.4	2.6-5.6	4.5-5.5	0	0
	25-75	0.7-5.3	0.5-4.0	4.5-6.5	0	0



# Soil Survey of Tidewater Cities Area, Virginia

Table 17.—Chemical Soil Properties—Continued

Map symbol and soil name	Depth	Cation- exchange capacity	Effective cation- exchange capacity	Soil reaction	Salinity	Sodium adsorp- tion ratio
	<u>Inches</u>	<u>meq/100 g</u>	<u>meq/100 g</u>	<u>pH</u>	<u>mmhos/cm</u>	
10: Urban land.						
11: Duckston-----	0-4	1.4-7.9	0.8-5.8	3.6-8.4	0	0
	4-60	0.0-0.9	0.0-0.7	3.6-8.4	0	0
12: Johnston-----	0-24	8.5-38	6.4-29	4.5-5.5	0	0
	24-30	1.6-9.8	1.2-7.3	4.5-5.5	0	0
	30-64	1.2-9.5	0.9-7.1	4.5-5.5	0	0
13: Lawnes-----	0-13	20-50	15-38	5.1-7.3	1.0-8.0	2-13
	13-55	2.9-24	2.2-18	5.1-7.3	1.0-8.0	2-13
	55-62	2.9-40	2.2-30	5.1-7.3	1.0-8.0	2-13
14: Levy-----	0-20	36-66	27-50	3.6-5.5	0.0-2.0	10-20
	20-40	24-55	18-41	3.6-5.5	0.0-2.0	10-20
	40-80	13-55	9.8-41	4.5-7.8	1.0-8.0	2-13
15: Munden-----	0-6	2.2-5.8	1.6-4.3	4.5-6.0	0	0
	6-38	2.8-7.4	2.1-5.6	4.5-6.0	0	0
	38-74	0.7-5.3	0.5-4.0	4.5-6.0	0	0
Urban land.						
16C, 16D: Nevarc-----	0-11	3.1-9.0	2.3-6.8	4.0-6.0	0	0
	11-54	8.8-15	6.6-11	4.0-6.0	0	0
	54-72	1.2-12	0.9-9.3	4.0-6.0	0	0
Uchee-----	0-4	1.2-9.2	0.9-6.9	4.5-5.5	0	0
	4-26	1.2-9.2	0.9-6.9	4.5-5.5	0	0
	26-50	1.0-5.6	0.5-6.5	4.5-5.5	0	0
	50-72	6.2-14	4.7-10	4.5-5.5	0	0
17: Newflat-----	0-6	4.6-16	3.5-12	4.0-5.5	0	0
	6-55	12-22	9.2-17	4.0-5.5	0	0
	55-64	12-22	9.2-17	4.0-5.5	0	0
Urban land.						
18: Nimmo-----	0-14	3.6-12	2.7-8.7	4.0-5.5	0	0
	14-32	2.8-7.4	2.1-5.6	4.0-5.5	0	0
	32-64	0.3-3.9	0.3-2.9	4.0-5.5	0	0
Urban land.						
19: Peawick-----	0-5	4.6-13	3.5-9.9	4.0-5.5	0	0
	5-36	12-22	9.2-17	4.0-5.5	0	0
	36-64	12-22	9.2-17	4.0-5.5	0	0
Urban land.						



# Soil Survey of Tidewater Cities Area, Virginia

Table 17.—Chemical Soil Properties—Continued

Map symbol and soil name	Depth	Cation- exchange capacity	Effective cation- exchange capacity	Soil reaction	Salinity	Sodium adsorp- tion ratio
	<u>Inches</u>	<u>meq/100 g</u>	<u>meq/100 g</u>	<u>pH</u>	<u>mmhos/cm</u>	
20: Seabrook-----	0-9	1.6-7.5	1.2-5.6	4.0-6.5	0	0
	9-60	0.5-4.1	0.4-3.1	4.0-6.5	0	0
	60-80	0.5-4.1	0.4-3.1	4.0-6.5	0	0
Urban land.						
21A, 21B: Slagle-----	0-10	3.1-9.0	2.3-6.8	4.0-5.5	0	0
	10-44	4.5-11	3.4-8.3	4.0-5.5	0	0
	44-63	4.5-11	3.4-7.5	4.0-5.5	0	0
Urban land.						
22: State-----	0-10	2.4-8.2	1.8-6.2	4.0-7.3	0	0
	10-56	4.5-9.6	3.4-7.2	4.0-5.5	0	0
	56-84	0.5-4.3	0.4-3.2	4.0-6.5	0	0
Urban land.						
23: Suffolk-----	0-10	2.1-4.8	1.6-3.6	4.0-6.0	0	0
	10-38	2.5-9.4	1.9-7.0	4.0-6.0	0	0
	38-65	1.0-3.0	0.8-2.2	4.0-6.0	0	0
24: Tomotley-----	0-4	4.0-20	3.0-15	4.0-5.5	0	0
	4-15	3.5-15	2.6-121	4.0-6.0	0	0
	15-65	7.4-14	5.6-11	4.0-5.5	0	0
	65-75	1.8-19	1.3-14	4.0-6.0	0	0
Urban land.						
25: Uchee-----	0-4	1.2-9.2	0.9-6.9	4.5-5.5	0	0
	4-26	1.2-9.2	0.9-6.9	4.5-5.5	0	0
	26-50	1.0-5.6	0.5-6.5	4.5-5.5	0	0
	50-72	6.2-14	4.7-10	4.5-5.5	0	0
26. Udorthents-Dumps						
27. Urban land						
28: Yemassee-----	0-15	3.6-14	2.7-10	4.0-6.5	0	0
	15-40	4.5-13	3.4-9.9	4.0-5.5	0	0
	40-60	3.0-11	2.2-8.3	4.0-5.5	0	0
Urban land.						
DAM. Dam						
W. Water						



Table 18.—Water Features

(Depths of layers are in feet. See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				<u>Ft</u>	<u>Ft</u>	<u>Ft</u>				
1: Altavista-----	C	Low	Dec.-Apr. May-Nov.	1.5-2.5 ---	>6.0 ---	--- ---	--- ---	None None	--- ---	None None
Urban land-----	D	Very high	Jan.-Dec.	2.0-6.6	>6.0	---	---	None	---	None
2: Augusta-----	C	Very high	Dec.-May June-Nov.	1.0-2.0 ---	>6.0 ---	--- ---	--- ---	None None	--- ---	None None
Urban land-----	D	Very high	Jan.-Dec.	2.0-6.6	>6.0	---	---	None	---	None
3: Axis-----	D	Negligible	Jan.-Dec.	0.0-1.0	>6.0	0.0-1.0	Long	Frequent	Very brief	Very frequent
4: Beaches-----	D	Negligible	Jan.-Dec.	---	---	---	---	None	Long	Frequent
5: Bethera-----	D	Negligible	Dec.-Apr. May-Nov.	0.0 ---	>6.0 ---	0.0-1.0 ---	Long ---	Occasional None	--- ---	None None
Urban land-----	D	Very high	Jan.-Dec.	2.0-6.6	>6.0	---	---	None	---	None
6: Bohicket-----	D	Negligible	Jan.-Dec.	0.0	>6.0	0.0-3.0	Very brief	Frequent	Very brief	Very frequent
7: Bojac-----	B	Very low	Dec.-Apr. May-Nov.	4.0-6.6 ---	>6.0 ---	--- ---	--- ---	None None	--- ---	None None



Table 18.—Water Features—Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				<u>Ft</u>	<u>Ft</u>	<u>Ft</u>				
7: Urban land-----	D	Very high	Jan.-Dec.	2.0-6.6	>6.0	---	---	None	---	None
8: Chickahominy-----	D	Very high	Nov.-Apr. May-Oct.	0.0-0.5 ---	>6.0 ---	---	---	None None	---	None None
Urban land-----	D	Very high	Jan.-Dec.	2.0-6.6	>6.0	---	---	None	---	None
9A, 9B: Craven-----	C	Low	Dec.-Apr. May-Nov.	2.0-3.0 ---	>6.0 ---	---	---	None None	---	None None
Urban land-----	D	Very high	Jan.-Dec.	2.0-6.6	>6.0	---	---	None	---	None
10: Dragston-----	C	Very low	Dec.-Apr. May-Nov.	1.0-2.5 ---	>6.0 ---	---	---	None None	---	None None
Urban land-----	D	Very high	Jan.-Dec.	2.0-6.6	>6.0	---	---	None	---	None
11: Duckston-----	A/D	Very high	Jan.-Dec.	0.0-0.5	>6.0	---	---	None	Brief	Frequent
12: Johnston-----	D	Negligible	Nov.-June July Aug.-Oct.	0.0 --- ---	>6.0 --- ---	0.0-1.0 --- ---	Long --- ---	Frequent None None	Long Long ---	Frequent Frequent None
13: Lawnes-----	D	Negligible	Jan.-Dec.	0.0	>6.0	0.0-3.0	Long	Frequent	Very long	Very frequent
14: Levy-----	D	Medium	Jan.-Dec.	0.0	>6.0	0.0-3.0	Very brief	Frequent	Very brief	Very frequent



Table 18.—Water Features—Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				<u>Ft</u>	<u>Ft</u>	<u>Ft</u>				
15: Munden-----	B	Very low	Dec.-Apr. May-Nov.	1.5-2.5 ---	>6.0 ---	--- ---	--- ---	None None	--- ---	None None
Urban land-----	D	Very high	Jan.-Dec.	2.0-6.6	>6.0	---	---	None	---	None
16C: Nevarc-----	C	Medium	Dec.-Apr. May-Nov.	1.5-3.0 ---	2.5-6.6 ---	--- ---	--- ---	None None	--- ---	None None
Uchee-----	A	Medium	Dec.-Apr. May-Nov.	3.5-5.0 ---	4.5-6.6 ---	--- ---	--- ---	None None	--- ---	None None
16D: Nevarc-----	C	Medium	Dec.-Apr. May-Nov.	1.5-3.0 ---	2.5-6.6 ---	--- ---	--- ---	None None	--- ---	None None
Uchee-----	A	High	Dec.-Apr. May-Nov.	3.5-5.0 ---	4.5-6.6 ---	--- ---	--- ---	None None	--- ---	None None
17: Newflat-----	D	Very high	Nov.-Apr. May-Oct.	0.5-1.5 ---	>6.0 ---	--- ---	--- ---	None None	--- ---	None None
Urban land-----	D	Very high	Jan.-Dec.	2.0-6.6	>6.0	---	---	None	---	None
18: Nimmo-----	D	Very high	Dec.-Apr. May-Nov.	0.0-1.0 ---	>6.0 ---	--- ---	--- ---	None None	--- ---	None None
Urban land-----	D	Very high	Jan.-Dec.	2.0-6.6	>6.0	---	---	None	---	None
19: Peawick-----	D	Medium	Nov.-Apr. May-Oct.	1.5-3.0 ---	2.5-4.0 ---	--- ---	--- ---	None None	--- ---	None None



Table 18.—Water Features—Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				<u>Ft</u>	<u>Ft</u>	<u>Ft</u>				
19: Urban land-----	D	Very high	Jan.-Dec.	2.0-6.6	>6.0	---	---	None	---	None
20: Seabrook-----	C	Very low	Dec.-Mar.	2.0-3.5	>6.0	---	---	None	---	None
			Apr.-Nov.	---	---	---	---	None	---	None
Urban land-----	D	Very high	Jan.-Dec.	2.0-6.6	>6.0	---	---	None	---	None
21A, 21B: Slagle-----	C	Low	Nov.-Apr.	1.5-3.0	>6.0	---	---	None	---	None
			May-Oct.	---	---	---	---	None	---	None
Urban land-----	D	Very high	Jan.-Dec.	2.0-6.6	>6.0	---	---	None	---	None
22: State-----	B	Low	Dec.-June	4.0-6.6	>6.0	---	---	None	---	Rare
			July-Nov.	---	---	---	---	None	---	Rare
Urban land-----	D	Very high	Jan.-Dec.	2.0-6.6	>6.0	---	---	None	---	None
23: Suffolk-----	B	Low	Jan.-Dec.	---	---	---	---	None	---	None
24: Tomotley-----	B/D	Very high	Dec.-Apr.	0.0-1.0	>6.0	---	---	None	---	None
			May-Nov.	---	---	---	---	None	---	None
Urban land-----	D	Very high	Jan.-Dec.	2.0-6.6	>6.0	---	---	None	---	None
25: Uchee-----	A	Low	Jan.-Apr.	3.5-5.0	4.5-6.6	---	---	None	---	None
			May-Dec.	---	---	---	---	None	---	None



Table 18.—Water Features—Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				<u>Ft</u>	<u>Ft</u>	<u>Ft</u>				
26: Udorthents-----	D	---	Jan.-Dec.	---	---	---	---	None	---	None
Dumps-----	D	---	Jan.-Dec.	---	---	---	---	None	---	None
27: Urban land-----	D	Very high	Jan.-Dec.	2.0-6.6	>6.0	---	---	None	---	None
28: Yemassee-----	C	Very high	Dec.-Apr.	1.0-1.5	>6.0	---	---	None	---	None
			May	1.5-6.6	>6.0	---	---	None	---	None
			June-Oct.	---	---	---	---	None	---	None
			November	1.5-6.6	>6.0	---	---	None	---	None
Urban land-----	D	Very high	Jan.-Dec.	2.0-6.6	>6.0	---	---	None	---	None
DAM. Dam										
W. Water										



# Soil Survey of Tidewater Cities Area, Virginia

Table 19.—Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Potential for frost action	Risk of corrosion	
		Uncoated steel	Concrete
1: Altavista-----	Low	Moderate	Moderate
Urban land-----	None	---	---
2: Augusta-----	Low	High	Moderate
Urban land-----	None	---	---
3: Axis-----	None	High	High
4: Beaches-----	Low	High	High
5: Bethera-----	Low	High	High
Urban land-----	None	---	---
6: Bohicket-----	---	High	High
7: Bojac-----	Low	Low	High
Urban land-----	None	---	---
8: Chickahominy-----	Low	High	High
Urban land-----	None	---	---
9A, 9B: Craven-----	Low	High	High
Urban land-----	None	---	---
10: Dragston-----	Low	Low	High
Urban land-----	None	---	---
11: Duckston-----	None	Low	Low
12: Johnston-----	Moderate	High	High
13: Lawnes-----	Low	High	High
14: Levy-----	None	High	High



# Soil Survey of Tidewater Cities Area, Virginia

Table 19.—Soil Features—Continued

Map symbol and soil name	Potential for frost action	Risk of corrosion	
		Uncoated steel	Concrete
15: Munden-----	Low	Low	High
Urban land-----	None	---	---
16C, 16D: Nevarc-----	Low	High	High
Uchee-----	Low	Low	High
17: Newflat-----	Low	High	High
Urban land-----	None	---	---
18: Nimmo-----	Low	Low	High
Urban land-----	None	---	---
19: Peawick-----	Low	High	High
Urban land-----	None	---	---
20: Seabrook-----	Low	Low	Moderate
Urban land-----	None	---	---
21A, 21B: Slagle-----	Low	Moderate	High
Urban land-----	None	---	---
22: State-----	None	Moderate	High
Urban land-----	None	---	---
23: Suffolk-----	Low	Moderate	High
24: Tomotley-----	Low	High	High
Urban land-----	None	---	---
25: Uchee-----	Low	Low	High
26: Udorthents.			
Dumps-----	None	---	---
27: Urban land-----	None	---	---



# Soil Survey of Tidewater Cities Area, Virginia

Table 19.—Soil Features—Continued

Map symbol and soil name	Potential for frost action	Risk of corrosion	
		Uncoated steel	Concrete
28: Yemassee-----	High	High	High
Urban land-----	None	---	---
DAM. Dam			
W. Water			



# Soil Survey of Tidewater Cities Area, Virginia

Table 20.--Taxonomic Classification of the Soils

(An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics that are outside the range of the series)

Soil name	Family or higher taxonomic class
Altavista-----	Fine-loamy, mixed, semiactive, thermic Aquic Hapludults
Augusta-----	Fine-loamy, mixed, semiactive, thermic Aeric Endoaquults
Axis-----	Coarse-loamy, mixed, superactive, nonacid, thermic Typic Sulfaquents
Bethera-----	Fine, mixed, semiactive, thermic Typic Paleaquults
Bohicket-----	Fine, mixed, superactive, nonacid, thermic Typic Sulfaquents
Bojac-----	Coarse-loamy, mixed, semiactive, thermic Typic Hapludults
Chickahominy-----	Fine, mixed, active, thermic Typic Endoaquults
Craven-----	Fine, mixed, subactive, thermic Aquic Hapludults
Dragston-----	Coarse-loamy, mixed, semiactive, thermic Aeric Endoaquults
Duckston-----	Siliceous, thermic Typic Psammaquents
*Johnston-----	Fine-loamy, siliceous, active, acid, thermic Cumulic Humaquepts
Lawnes-----	Coarse-loamy, mixed, superactive, nonacid, thermic Typic Sulfaquents
Levy-----	Fine, mixed, superactive, acid, thermic Typic Hydraquents
Munden-----	Coarse-loamy, mixed, semiactive, thermic Aquic Hapludults
Nevarc-----	Fine, mixed, subactive, thermic Aquic Hapludults
Newflat-----	Fine, mixed, subactive, thermic Aeric Endoaquults
Nimmo-----	Coarse-loamy, mixed, semiactive, thermic Typic Endoaquults
*Peawick-----	Fine, mixed, active, thermic Aquic Paleudults
Seabrook-----	Mixed, thermic Aquic Udipsamments
Slagle-----	Fine-loamy, siliceous, subactive, thermic Aquic Hapludults
State-----	Fine-loamy, mixed, semiactive, thermic Typic Hapludults
Suffolk-----	Fine-loamy, siliceous, semiactive, thermic Typic Hapludults
Tomotley-----	Fine-loamy, mixed, semiactive, thermic Typic Endoaquults
Uchee-----	Loamy, kaolinitic, thermic Arenic Kanhapludults
Udorthents-----	Udorthents
*Yemassee-----	Fine-loamy, siliceous, semiactive, thermic Aquic Hapludults



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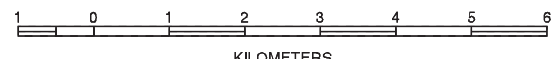
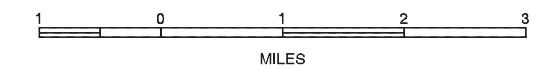
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INDEX TO MAP SHEETS  
TIDEWATER CITIES AREA, VIRGINIA



SCALE = 1:100000



SOIL LEGEND

Map symbols consist of a combination of numbers and letters. The numbers are listed numerically and represent the kind of soil or soils in the map unit. A capital letter indicates the slope class. Water is the only map unit that is represented by a single capital letter. Dam and Water are the only map units represented by all capital letters.

SYMBOL	NAME
1	Altavista-Urban land complex, 0 to 3 percent slopes
2	Augusta-Urban land complex, 0 to 2 percent slopes
3	Axis very fine sandy loam, 0 to 2 percent slopes, very frequently flooded
4	Beaches
5	Bethera-Urban land complex, 0 to 2 percent slopes
6	Bohicket muck, 0 to 1 percent slopes, very frequently flooded
7	Bojac-Urban land complex, 0 to 3 percent slopes
8	Chickahominy-Urban land complex, 0 to 2 percent slopes
9A	Craven-Urban land complex, 0 to 2 percent slopes
9B	Craven-Urban land complex, 2 to 6 percent slopes
10	Dragston-Urban land complex, 0 to 2 percent slopes
11	Duckston fine sand, 0 to 2 percent slopes, frequently flooded
12	Johnston loam, 0 to 2 percent slopes, frequently flooded
13	Lawnes loam, 0 to 1 percent slopes, very frequently flooded
14	Levy silty clay, 0 to 2 percent slopes, very frequently flooded
15	Munden-Urban land complex, 0 to 3 percent slopes
16C	Nevarc-Uchee complex, 6 to 15 percent slopes
16D	Nevarc-Uchee complex, 15 to 50 percent slopes
17	Newflat-Urban land complex, 0 to 2 percent slopes
18	Nimmo-Urban land complex, 0 to 2 percent slopes
19	Peawick-Urban land complex, 0 to 3 percent slopes
20	Seabrook-Urban land complex, 0 to 2 percent slopes
21A	Slagle-Urban land complex, 0 to 2 percent slopes
21B	Slagle-Urban land complex, 2 to 6 percent slopes
22	State-Urban land complex, 0 to 3 percent slopes
23	Suffolk fine sandy loam, 2 to 6 percent slopes
24	Tomotley-Urban land complex, 0 to 2 percent slopes
25	Uchee loamy fine sand, 2 to 6 percent slopes
26	Udorthents-Dumps complex
27	Urban land
28	Yemassee-Urban land complex, 0 to 2 percent slopes
DAM	Dam
W	Water

CONVENTIONAL AND SPECIAL  
SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

National, state, or province	-- --
County or parish	— —
Minor civil division	- - - -
Limit of soil survey (label) and/or denied access area	— — — —
Field sheet matchline and neatline	— — — —

ROAD EMBLEMS AND DESIGNATIONS

Interstate	
Federal	
State	

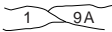
HYDROGRAPHIC FEATURES

STREAMS

Unclassified stream	Label only
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SPECIAL SYMBOLS FOR SOIL  
SURVEY AND SSURGO

SOIL DELINEATIONS AND SYMBOLS



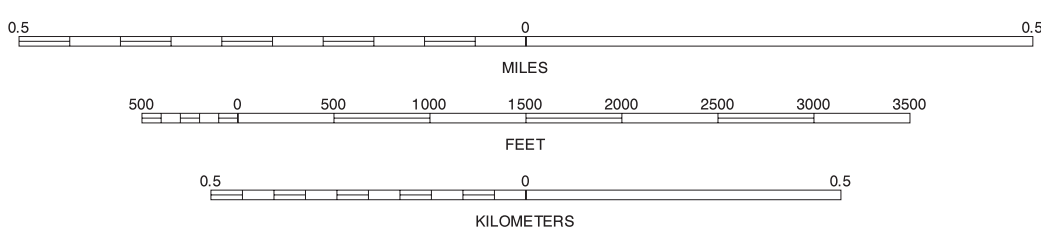
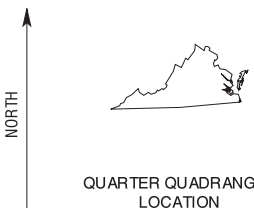




Joins sheet 2,  
York Island SE

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1934-1995 aerial photography. Culture information was acquired from Natural Resources Conservation Service. The Cultural layer was edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



2	2 YORKTOWN NE
3	3 HOG ISLAND SE
4	4 YORKTOWN SW
5	5 YORKTOWN SE

INDEX TO ADJOINING 3.75 MAPS

YORKTOWN NW, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 1 OF 40

Soil map delineations extending beyond the dashed white quadrangle nealline are for reference only and are included on adjacent map sheets.

Joins sheet 5,  
Yorktown SE





Joins sheet 1, Yorktown NW

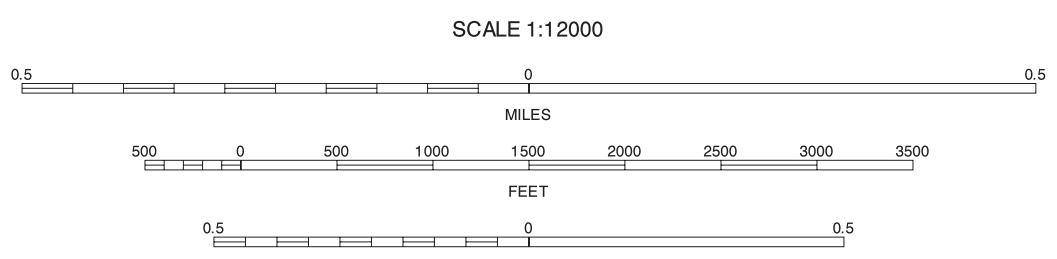
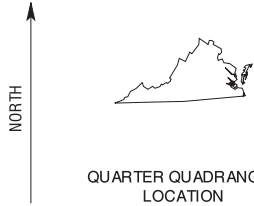
Joins sheet 3, Yorktown SE

Joins sheet 4, Yorktown SW

Joins sheet 6, Popoison West SW

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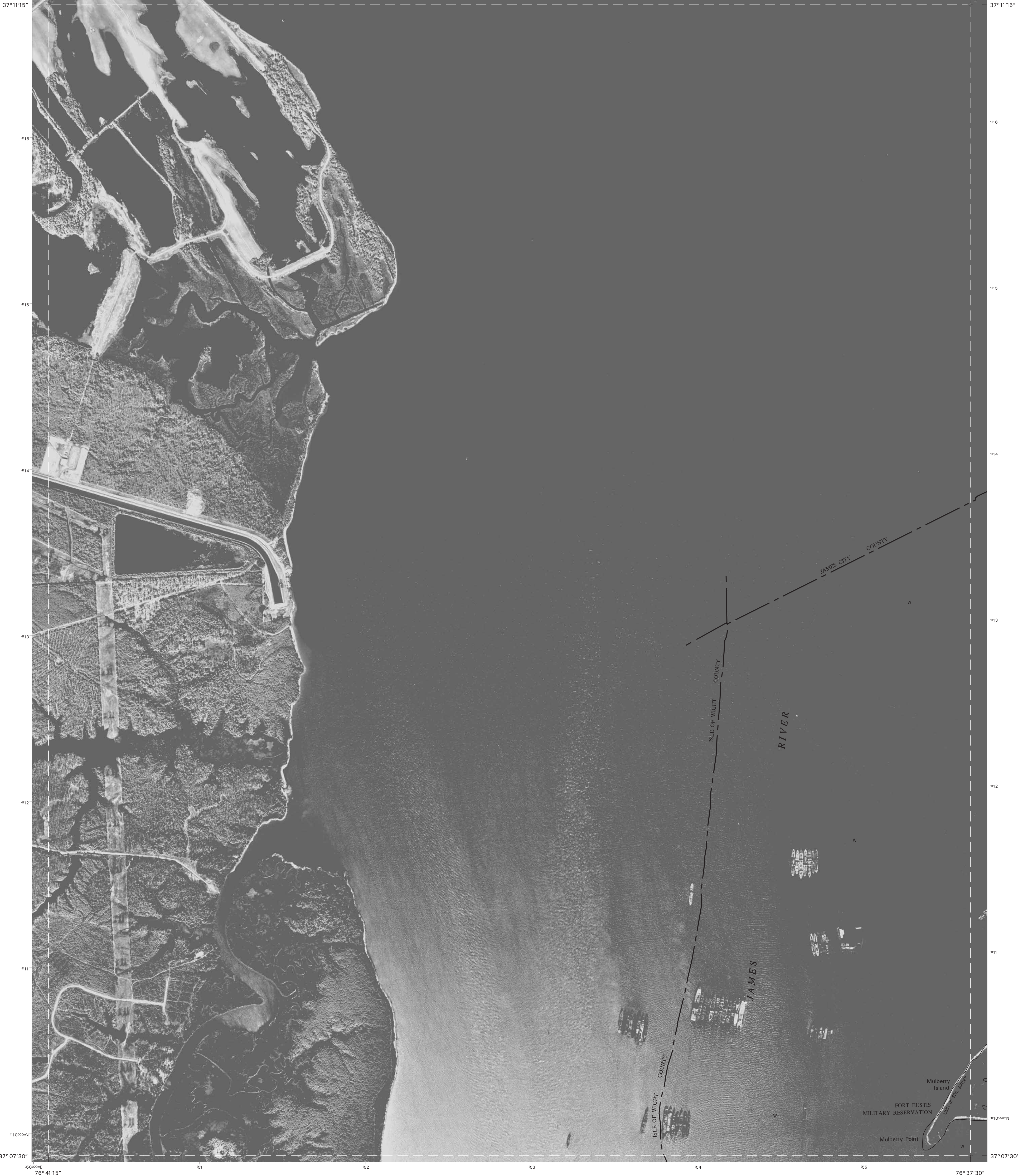
1	4	5	6
1 YORKTOWN NW	4 YORKTOWN SW	5 YORKTOWN SE	6 POPOISON WEST SW

INDEX TO ADJOINING 3.75 MAPS

YORKTOWN NE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 2 OF 40

Soil map delineations extending beyond the dashed white quadrangle nealline are for reference only and are included on adjacent map sheets.

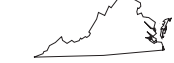




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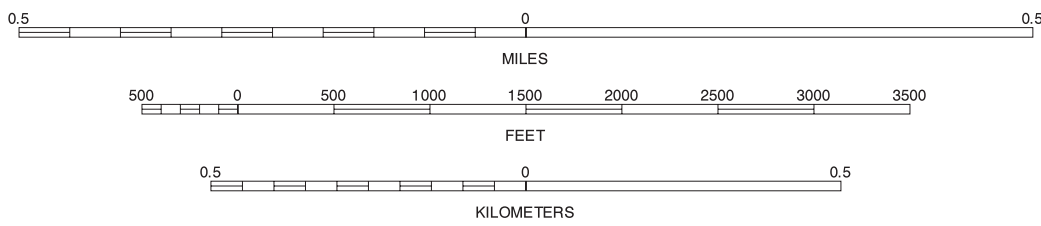
NORTH



QUARTER QUADRANGLE  
LOCATION

Joins sheet 10, Bacons Castle NE

SCALE 1:12000



		1
	4	4
10	11	

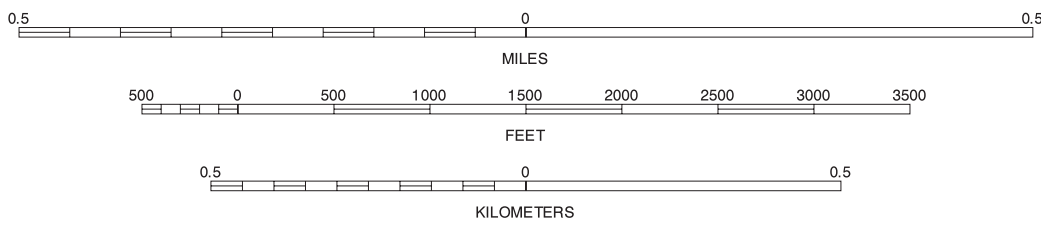
1 YORKTOWN NW  
4 YORKTOWN SW  
10 BACONS CASTLE NE  
11 MULBERRY ISLAND NW

INDEX TO ADJOINING 3.75 MAPS

HOG ISLAND SE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 3 OF 40

Soil map delineations extending beyond the dashed white quadrangle nealline are for reference only and are included on adjacent map sheets.





	1	2
3	4	5
10	11	12

1 YORKTOWN NW  
2 YORKTOWN NE  
3 HOG ISLAND SE  
4 YORKTOWN SE  
5 BACONS CASTLE NE  
10 MULBERRY ISLAND NW  
11 MULBERRY ISLAND NE  
12 MULBERRY ISLAND NE

INDEX TO ADJOINING 3.75 MAPS

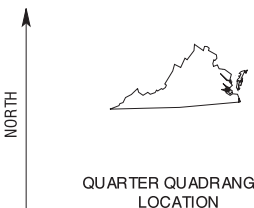
YORKTOWN SW, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 4 OF 40

Soil map delineations extending beyond the dashed white quadrangle nealline are for reference only and are included on adjacent map sheets.



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



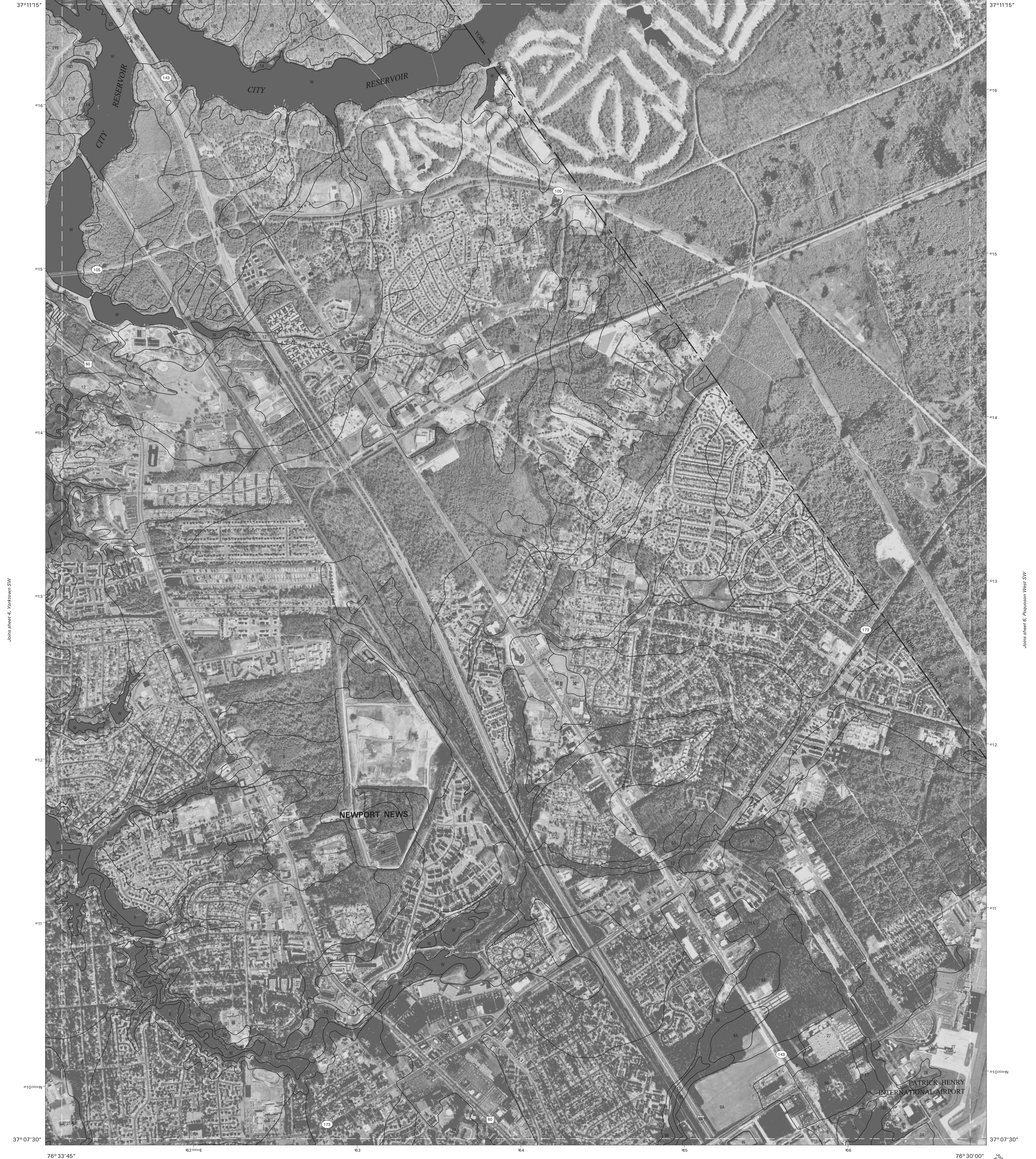


Joins sheet 1  
Yorktown NW

UNITED STATES  
DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE  
76° 33' 45"

Joins sheet 2, Yorktown NE

TIDEWATER CITIES AREA, VIRGINIA  
YORKTOWN SE QUADRANGLE  
SHEET NUMBER 5 OF 40  
76° 30' 00"

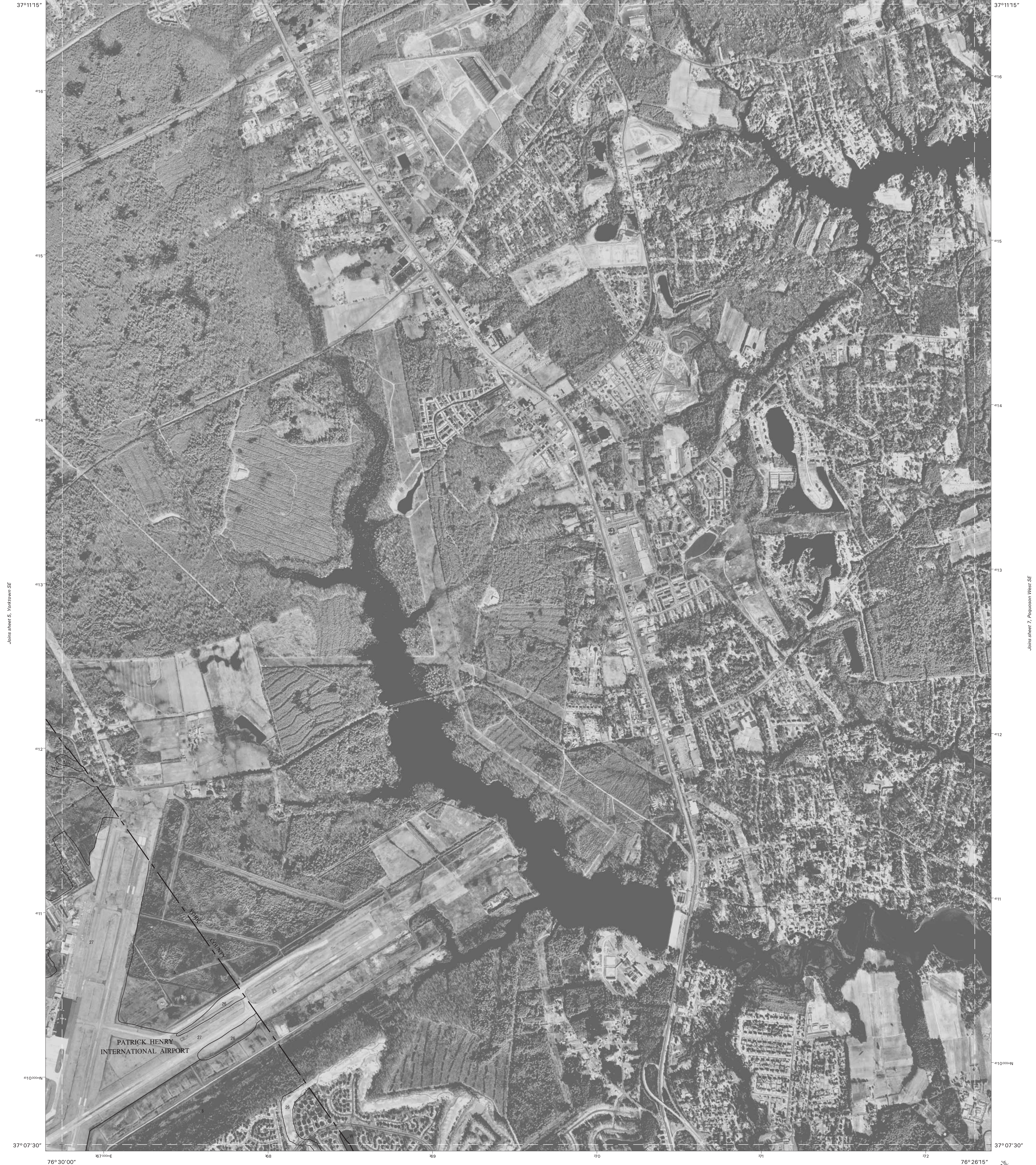




Joins sheet 2  
Yorktown NE

UNITED STATES  
DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE  
76° 30' 00"

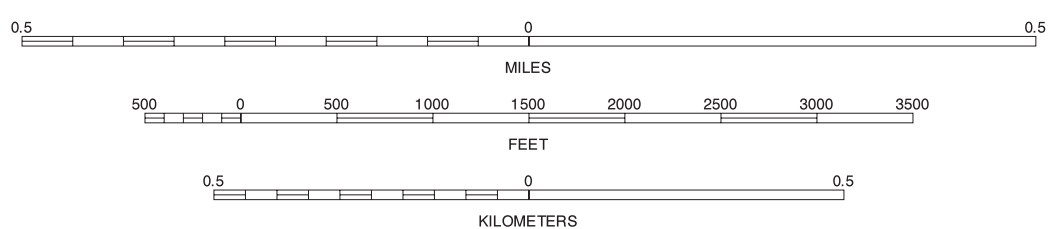
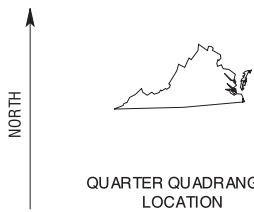
TIDEWATER CITIES AREA, VIRGINIA  
POQUOSON WEST SW QUADRANGLE  
SHEET NUMBER 6 OF 40  
76° 26' 15"



Joins sheet 12  
Mulberry Island NE

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1984-1995 aerial photography. Culture information was acquired from Natural Resources Conservation Service. The Cultural layer was edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



2			2 YORKTOWN NE
5		7	5 YORKTOWN SE 7 POQUOSON WEST SE 12 MULBERRY ISLAND NE 13 NEWPORT NEWS NORTH NW 14 NEWPORT NEWS NORTH NE
12	13	14	

INDEX TO ADJOINING 3.75 MAPS

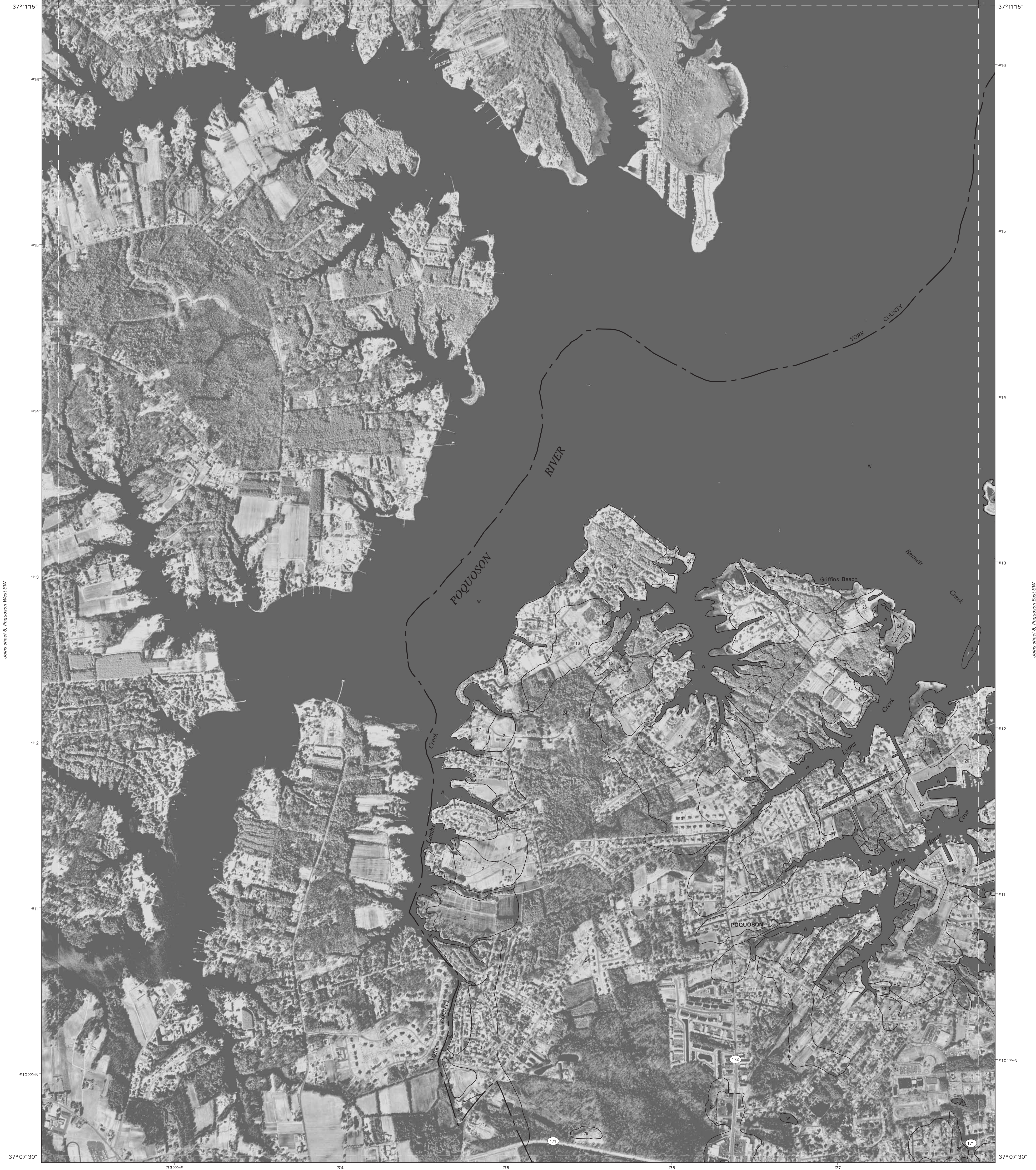
POQUOSON WEST SW, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 6 OF 40

Soil map delineations extending beyond the dashed white quadrangle nealline are for reference only and are included on adjacent map sheets.

Joins sheet 14  
Newport News North NE

Joins sheet 13, Newport News North NW

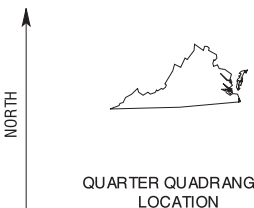




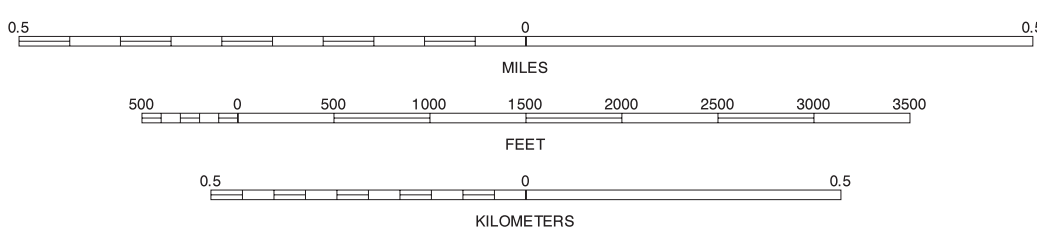
Joins sheet 13,  
Newport News North NW

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1984-1995 aerial photography. Culture information was acquired from Natural Resources Conservation Service. The Cultural layer was edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE  
LOCATION



6	8	POQUOSON WEST SW
13	14	POQUOSON EAST SW
		13 NEWPORT NEWS NORTH NW
		14 NEWPORT NEWS NORTH NE
		15 HAMPTON NW

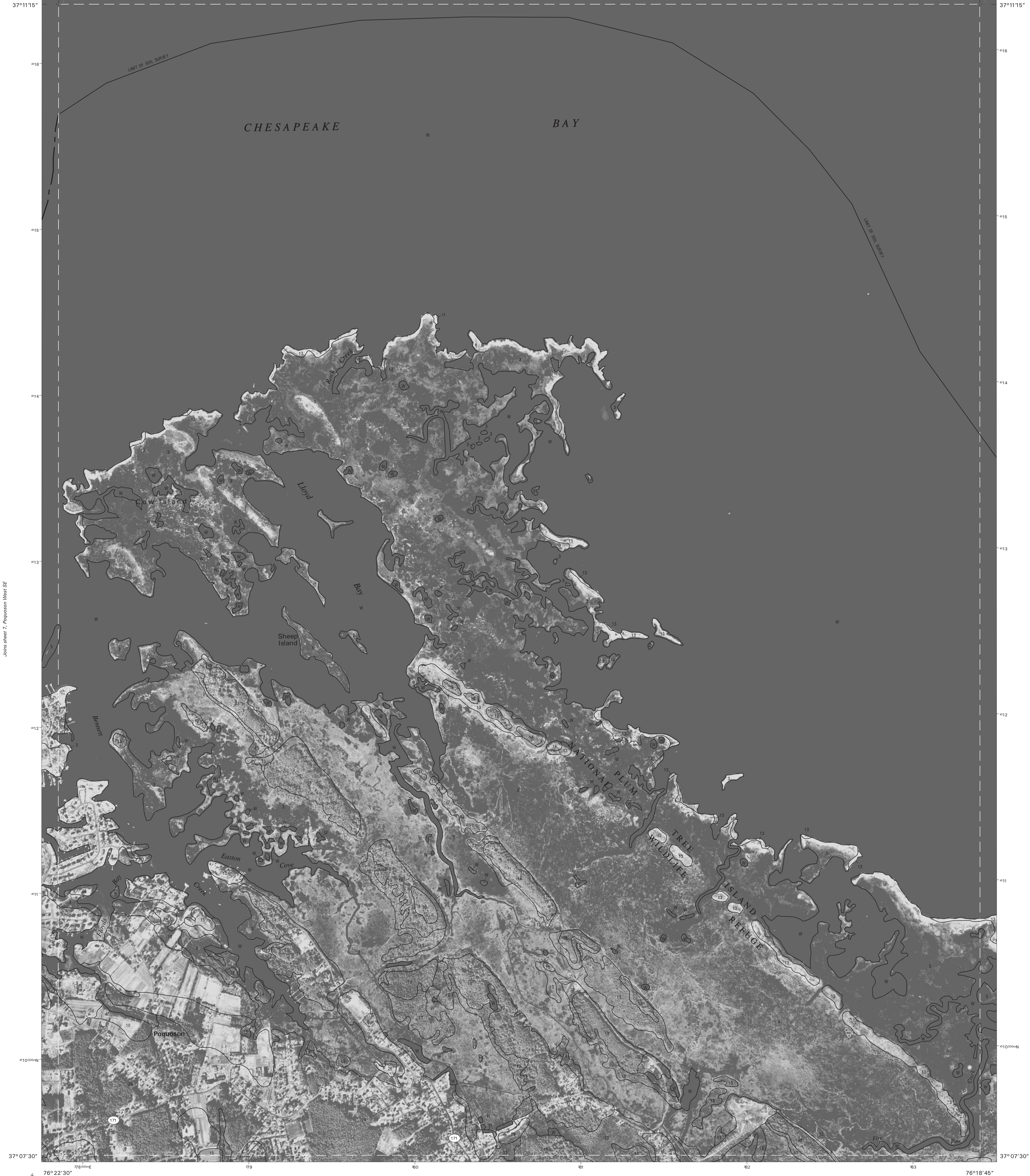
INDEX TO ADJOINING 3.75 MAPS

POQUOSON WEST SE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 7 OF 40

Soil map delineations extending beyond the dashed white quadrangle nealline are for reference only and are included on adjacent map sheets.

Joins sheet 15,  
Hampton NW

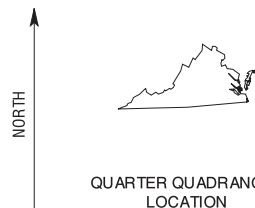




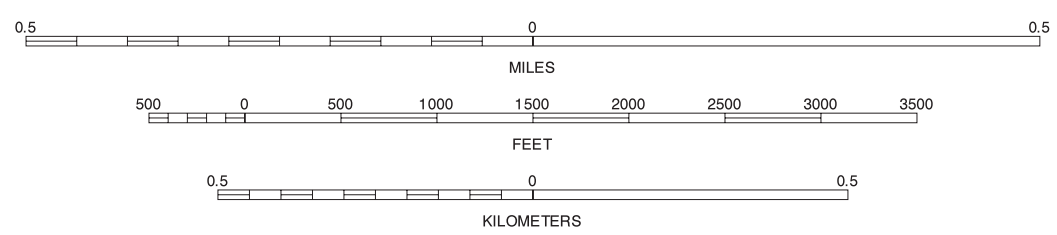
Joins sheet 14,  
Newport News North NE

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1984-1995 aerial photography. Culture information was acquired from Natural Resources Conservation Service. The Cultural layer was edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE  
LOCATION



Joins sheet 15, Hampton NW

SCALE 1:12000

7	9	7 POQUOSON WEST SE 9 POQUOSON EAST SE 14 NEWPORT NEWS NORTH NE 15 HAMPTON NW 16 HAMPTON NE
14	15	16

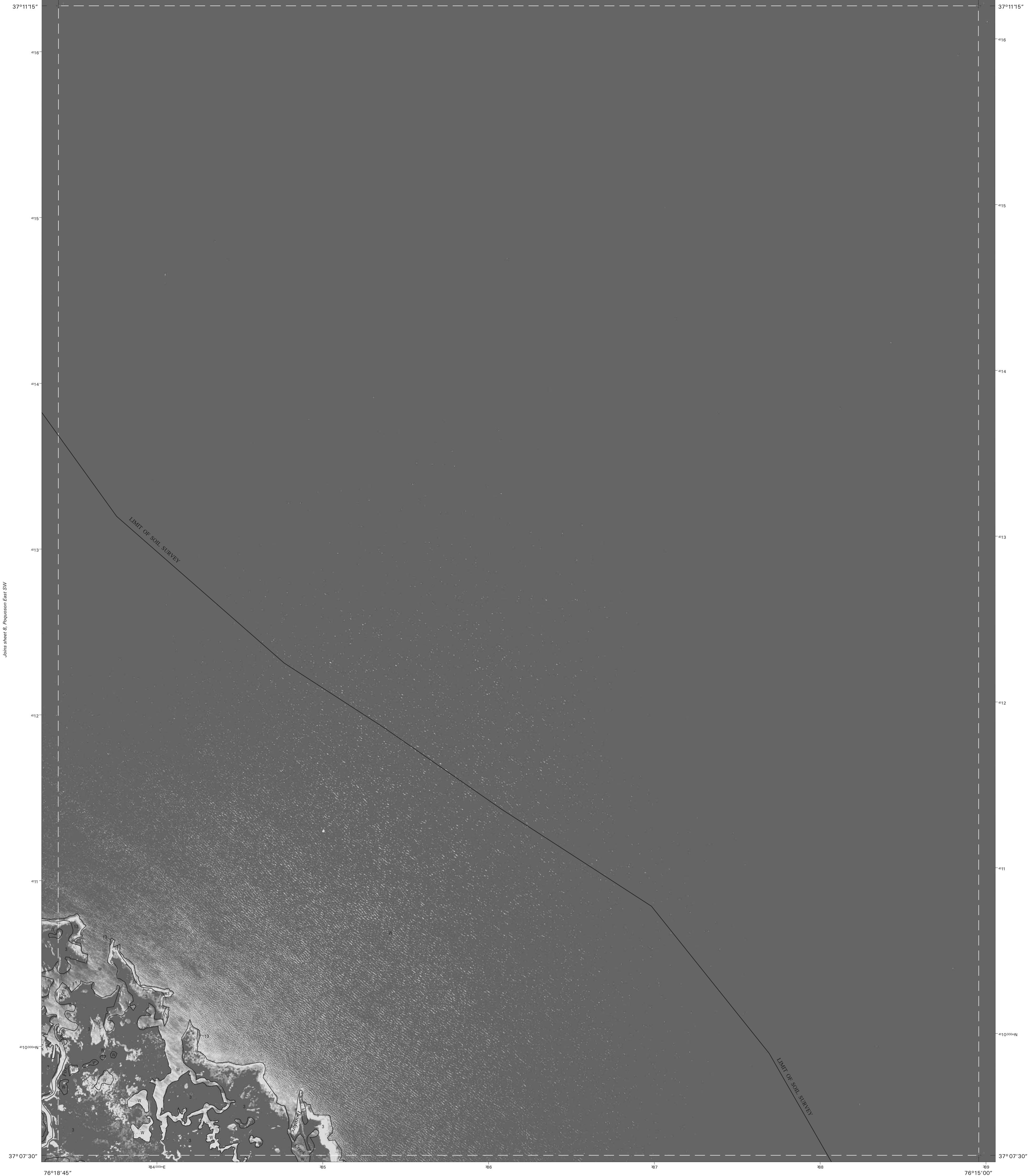
INDEX TO ADJOINING 3.75 MAPS

POQUOSON EAST SW, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 8 OF 40

Soil map delineations extending beyond the dashed white quadrangle nealline are for reference only and are included on adjacent map sheets.

Joins sheet 16,  
Hampton NE





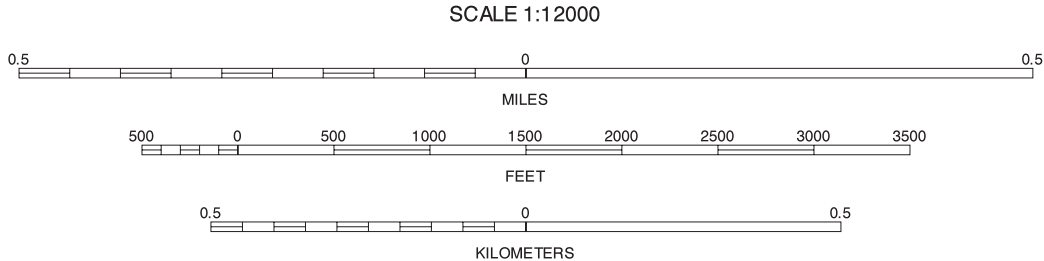
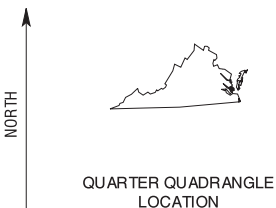
Joins sheet 8, Poquoson East SW

Joins sheet 15, Hampton NW

Joins sheet 16, Hampton NE

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1984-1995 aerial photography. Culture information was acquired from Natural Resources Conservation Service. The Cultural layer was edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



8		8	POQUOSON EAST SW
		15	HAMPTON NW
15	16	16	HAMPTON NE

INDEX TO ADJOINING 3.75 MAPS

POQUOSON EAST SE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 9 OF 40

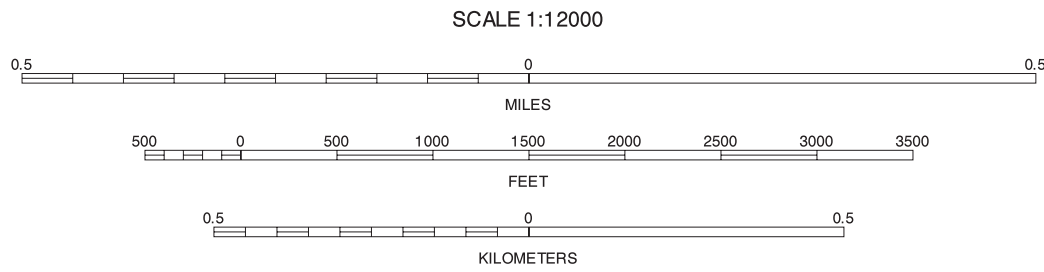
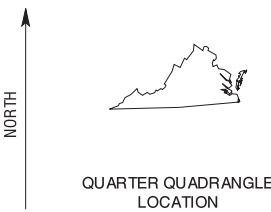
Soil map delineations extending beyond the dashed white quadrangle nealline are for reference only and are included on adjacent map sheets.





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North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



3	4	3 HOG ISLAND SE 4 YORKTOWN SW
11	17	11 MULBERRY ISLAND NW 17 MULBERRY ISLAND SW

INDEX TO ADJOINING 3.75 MAPS

BACONS CASTLE NE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 10 OF 40

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.



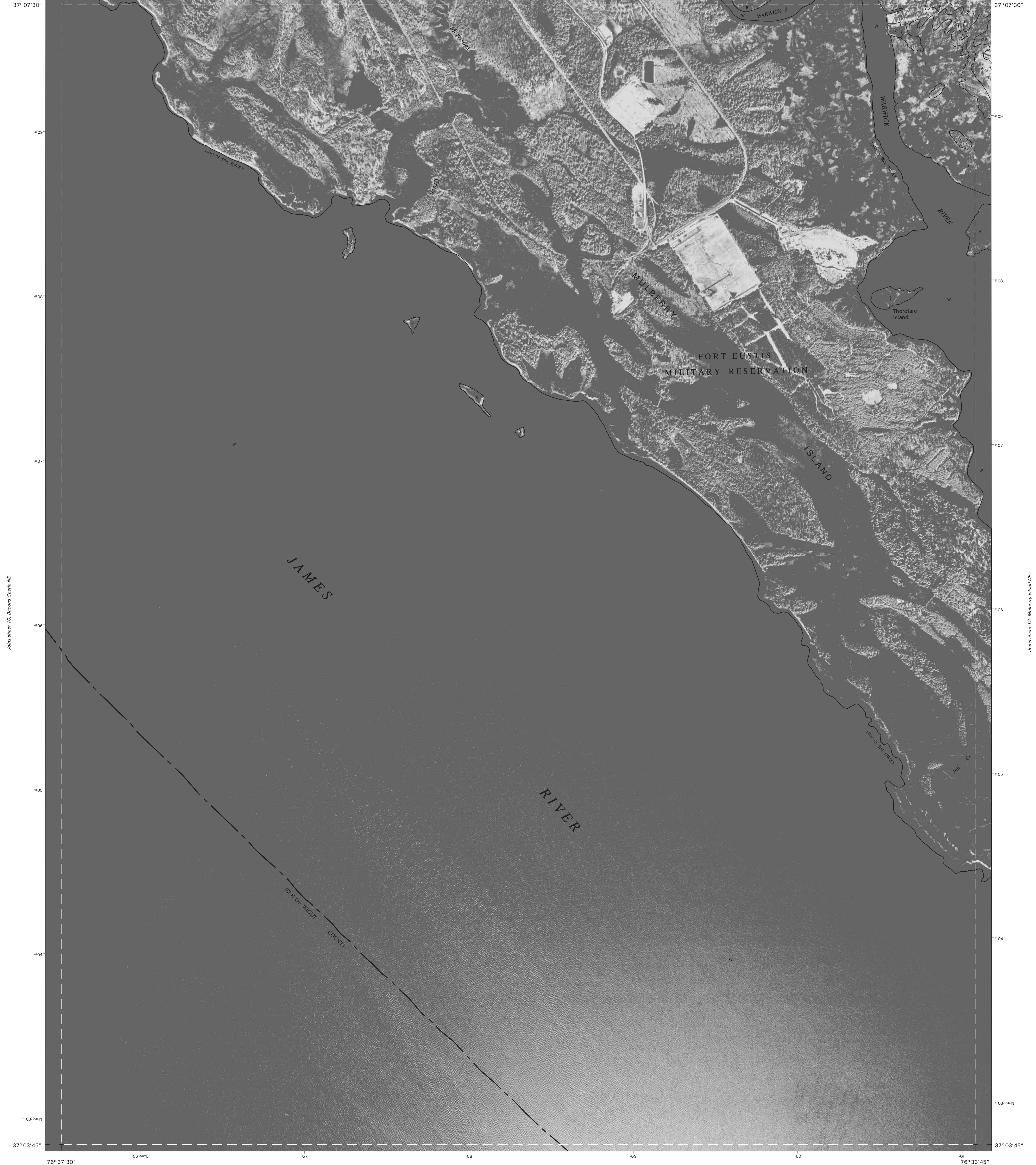
Joins sheet 3  
Mulberry Island SE

UNITED STATES  
DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE  
76° 37' 30"

Joins sheet 4, Yorktown SW

TIDEWATER CITIES AREA, VIRGINIA  
MULBERRY ISLAND NW QUADRANGLE  
SHEET NUMBER 11 OF 40  
76° 33' 45"

Joins sheet 5  
Yorktown SE

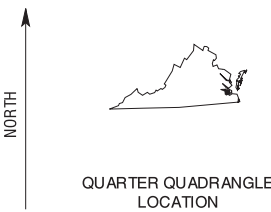


Joins sheet 10, Bacons Castle NE

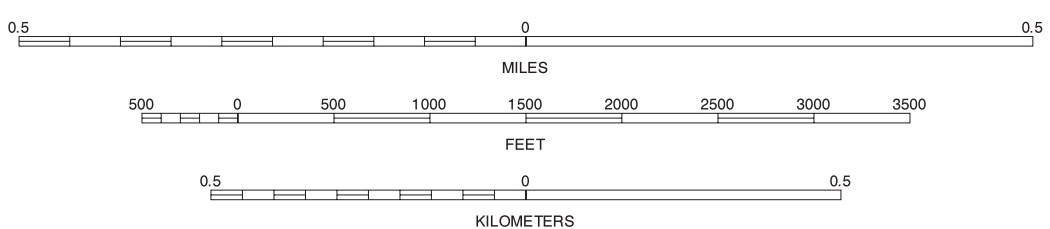
Joins sheet 12, Mulberry Island NE

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North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE  
LOCATION



Joins sheet 17, Mulberry Island SW

SCALE 1:12000

3	4	5
10		12
	17	18

INDEX TO ADJOINING 3.75 MAPS

3 HOG ISLAND SE  
4 YORKTOWN SW  
5 YORKTOWN SE  
10 BACONS CASTLE NE  
12 MULBERRY ISLAND NE  
17 MULBERRY ISLAND SW  
18 MULBERRY ISLAND SE

MULBERRY ISLAND NW, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 11 OF 40

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

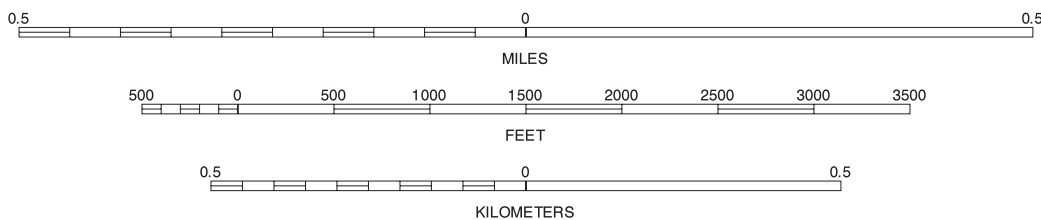
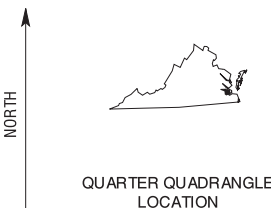
Joins sheet 13  
Mulberry Island SE





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North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



4	5	6	4 YORKTOWN SW
			5 YORKTOWN SE
			6 POQUOSON WEST SW
11		13	11 MULBERRY ISLAND NW
			13 NEWPORT NEWS NORTH NW
			17 MULBERRY ISLAND SW
17	18	19	18 MULBERRY ISLAND SE
			19 NEWPORT NEWS NORTH SW

INDEX TO ADJOINING 3.75 MAPS

MULBERRY ISLAND NE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 12 OF 40

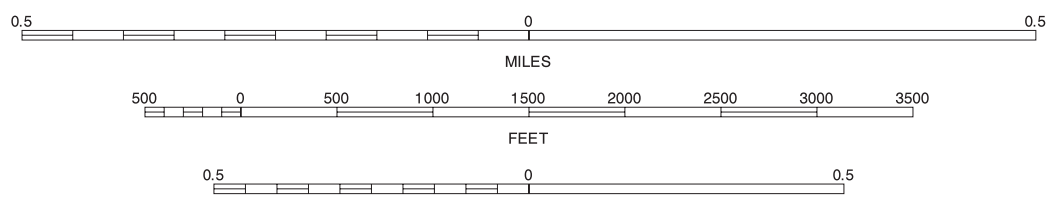
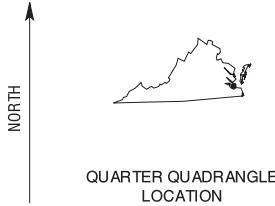
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.





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North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



5	6	7
12	13	14
18	19	20

INDEX TO ADJOINING 3.75 MAPS

NEWPORT NEWS NORTH NW, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 13 OF 40

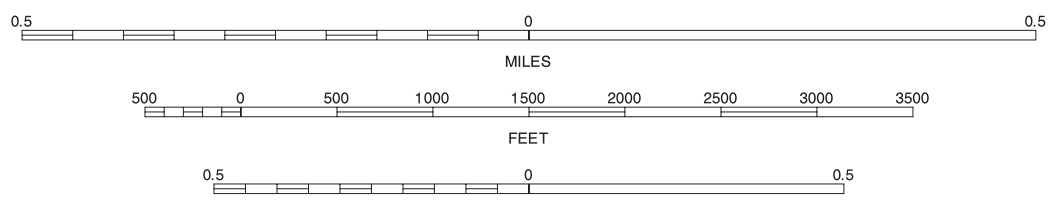
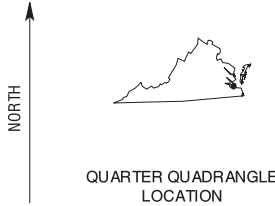
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.





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6	7	8
13		15
19	20	21

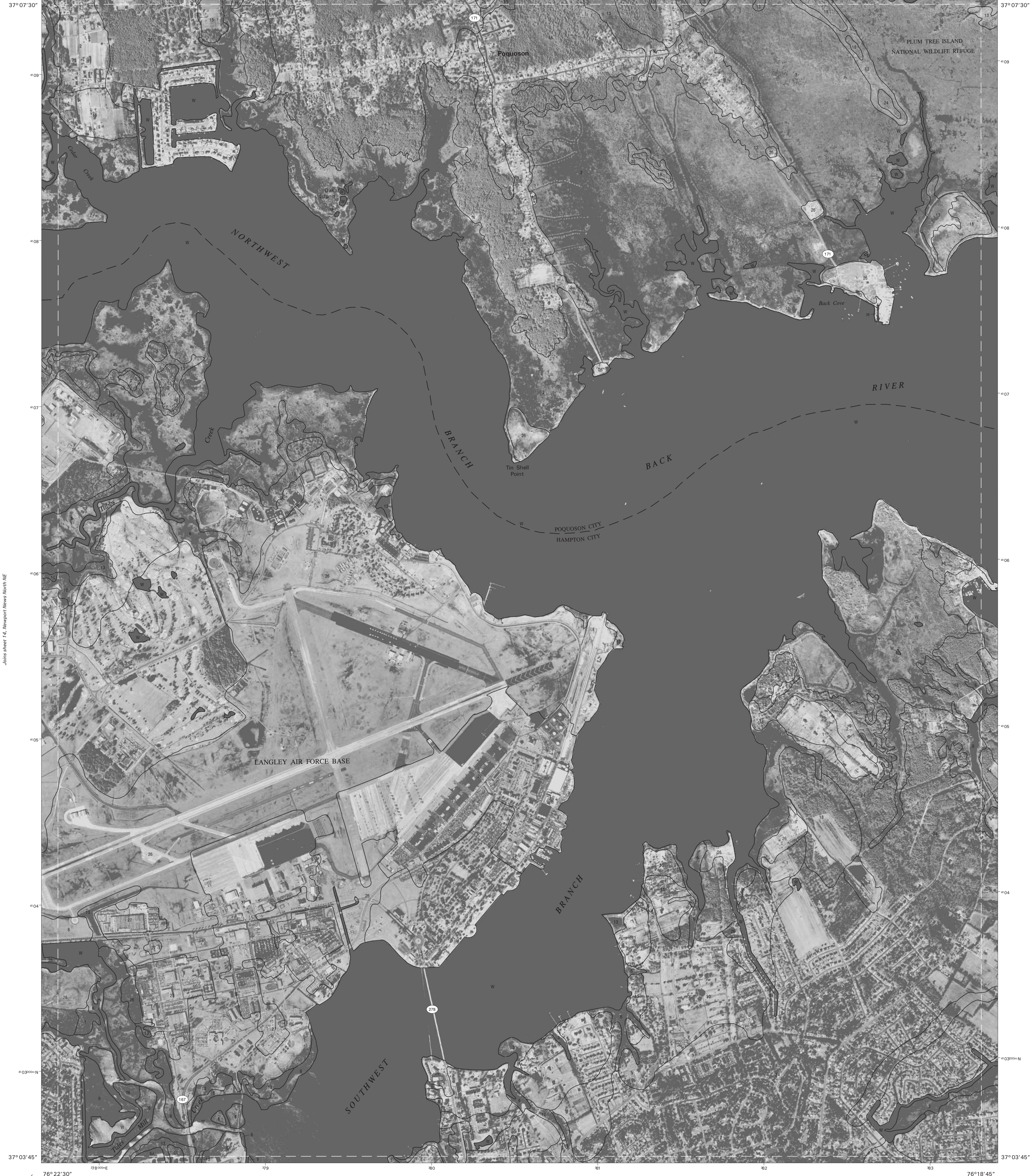
NEWPORT NEWS NORTH NE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 14 OF 40

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.



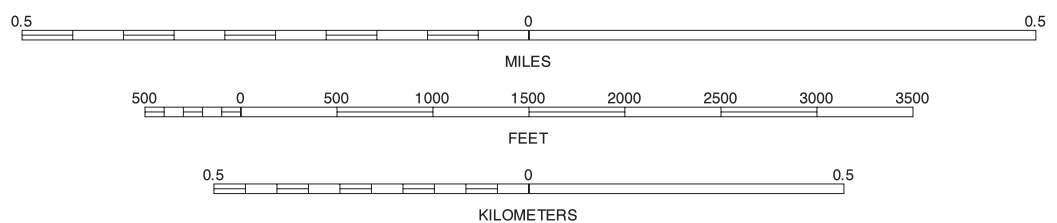
Joins sheet 8, Poquoson East SW

Joins sheet 9, Poquoson East SE



Joins sheet 21, Hampton SW

SCALE 1:12000



7	8	9	7 POQUOSON WEST SE 8 POQUOSON EAST SW 9 POQUOSON EAST SE
14		16	14 NEWPORT NEWS NORTH NE 16 HAMPTON NE 20 NEWPORT NEWS NORTH SE
20	21	22	21 HAMPTON SW 22 HAMPTON SE

INDEX TO ADJOINING 3.75 MAPS

HAMPTON NW, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 15 OF 40

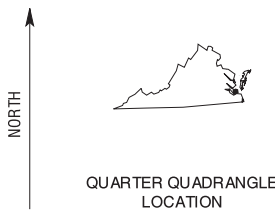
Soil map delineations extending beyond the dashed white quadrangle neatlne are for reference only and are included on adjacent map sheets.

Joins sheet 20, Newport News North SE

Joins sheet 22, Hampton SE

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North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE LOCATION



Joins sheet 8,  
Poquoson East SW

Joins sheet 9, Poquoson East SE

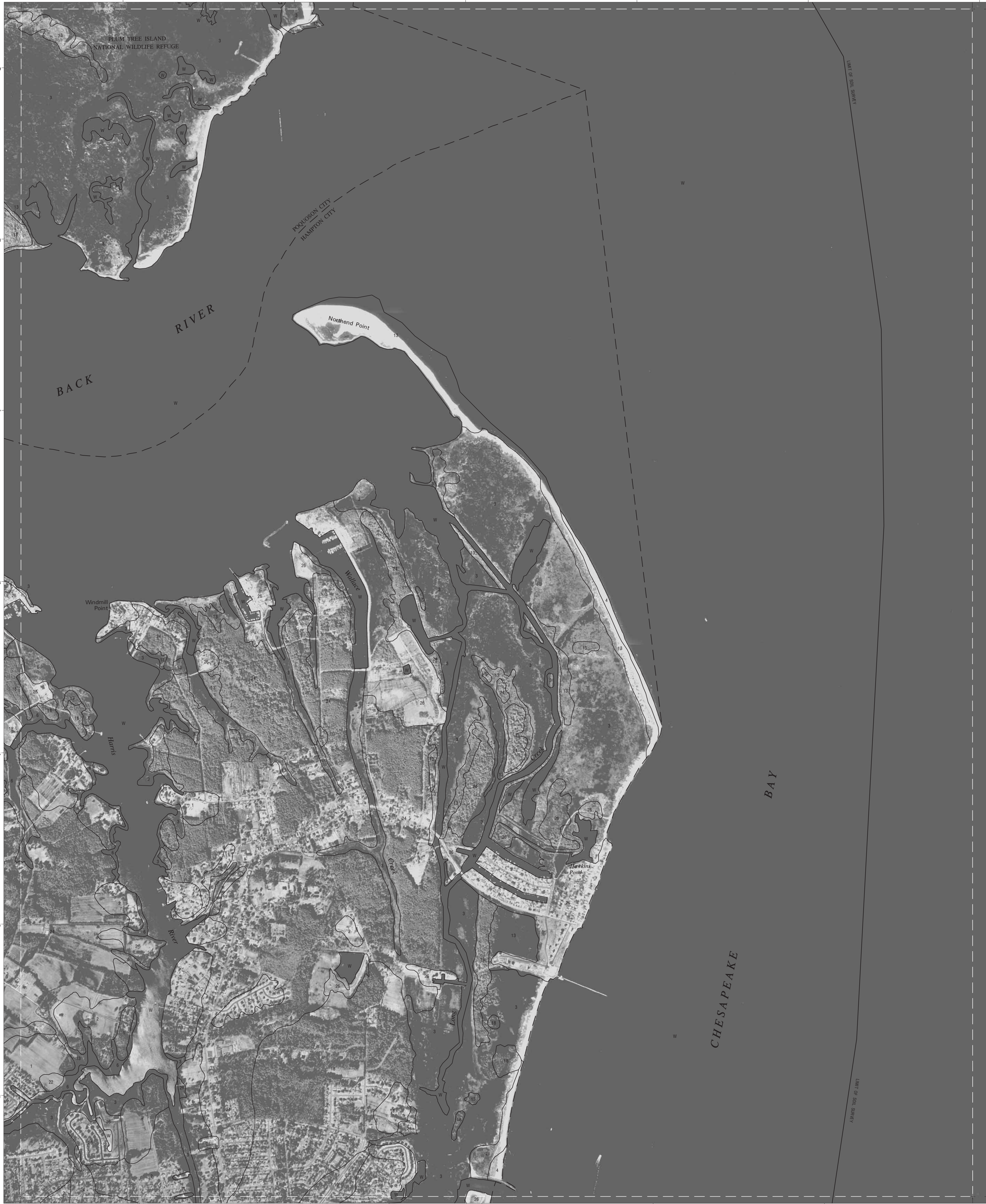
37°07'30"

37°07'30"

Joins sheet 15, Hampton NW

37°03'45"

37°03'45"

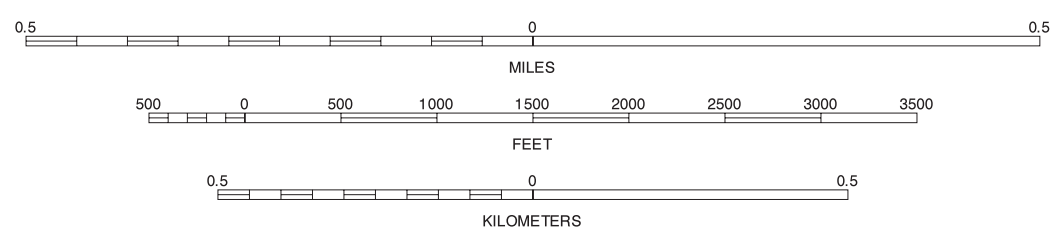
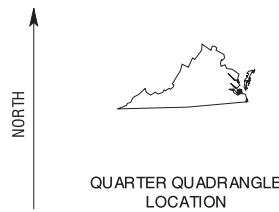


Joins sheet 21,  
Hampton SW

Joins sheet 22, Hampton SE

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



8	9	8 POQUOSON EAST SW 9 POQUOSON EAST SE
15		15 HAMPTON NW 21 HAMPTON SW 22 HAMPTON SE
21	22	

INDEX TO ADJOINING 3.75 MAPS

HAMPTON NE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 16 OF 40

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.



Joins sheet 10,  
Bacon's Castle NE

UNITED STATES  
DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE  
76° 37' 30"

TIDEWATER CITIES AREA, VIRGINIA  
MULBERRY ISLAND SW QUADRANGLE  
SHEET NUMBER 17 OF 40  
76° 33' 45"

Joins sheet 12,  
Mulberry Island NE

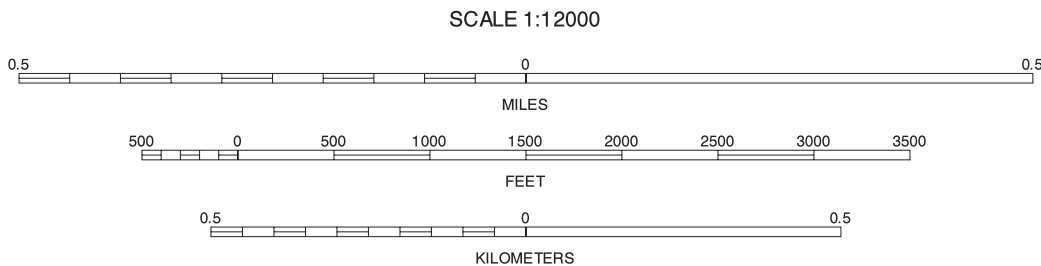
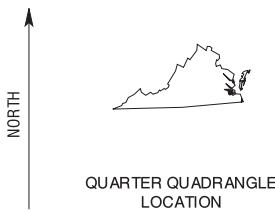
Joins sheet 11, Mulberry Island NW



Joins sheet 18, Mulberry Island SE

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



10	11	12
10 BACONS CASTLE NE	11 MULBERRY ISLAND NW	12 MULBERRY ISLAND NE
		18
		18 MULBERRY ISLAND SE

INDEX TO ADJOINING 3.75 MAPS

MULBERRY ISLAND SW, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 17 OF 40

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.



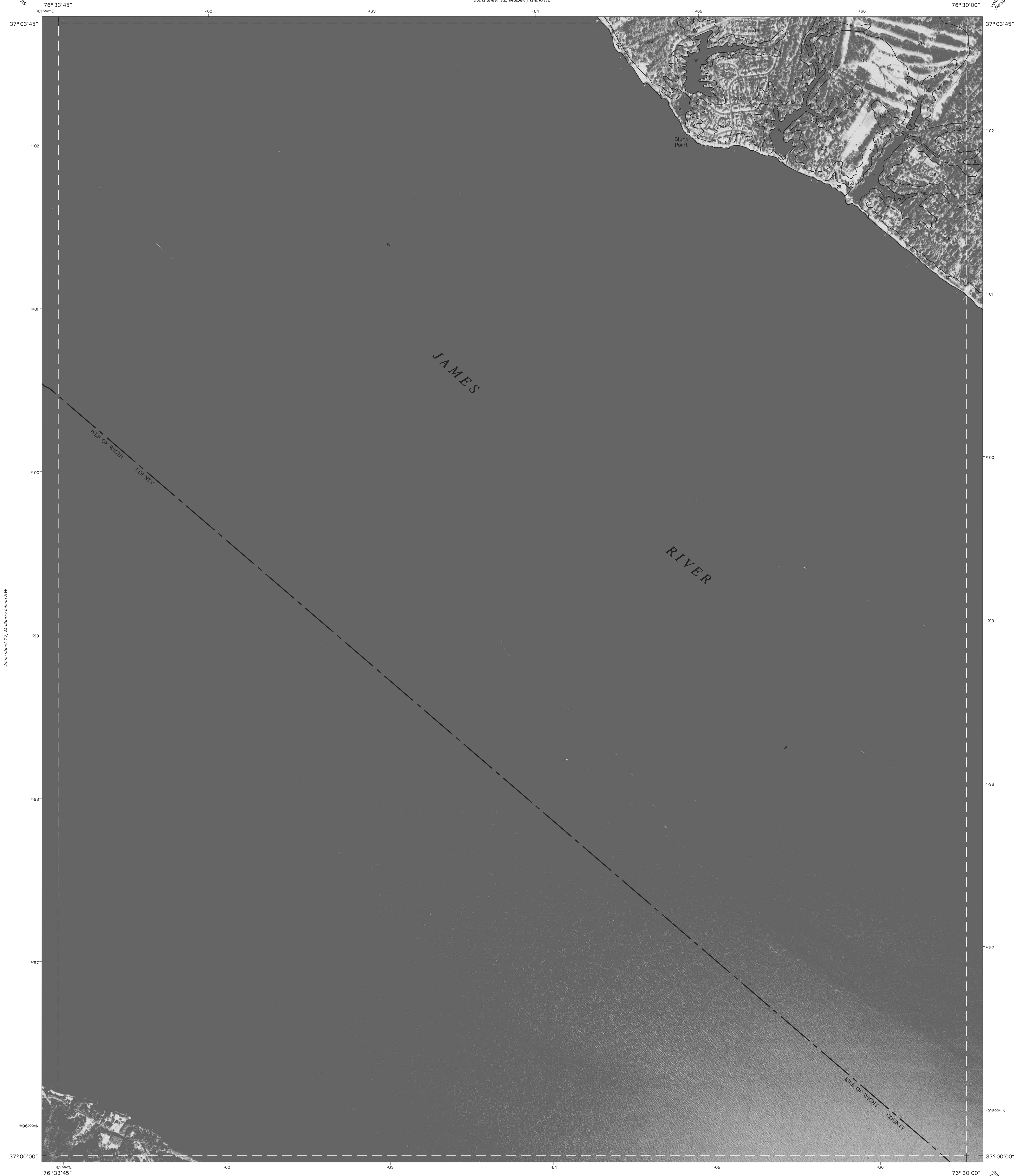
Joins sheet 11,  
Mulberry Island NW

UNITED STATES  
DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE

TIDEWATER CITIES AREA, VIRGINIA  
MULBERRY ISLAND SE QUADRANGLE  
SHEET NUMBER 18 OF 40

Joins sheet 13,  
Newport News North NW

Joins sheet 12, Mulberry Island NE



Joins sheet 17, Mulberry Island SW

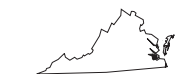
Joins sheet 19, Newport News North SW

Joins sheet 23,  
Newport News South NW

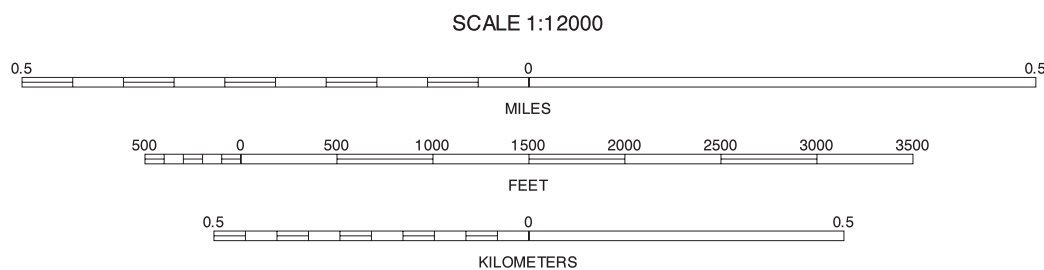
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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUARTER QUADRANGLE  
LOCATION



11	12	13
17	18	19
		23

INDEX TO ADJOINING 3.75 MAPS

11 MULBERRY ISLAND NW  
12 MULBERRY ISLAND NE  
13 NEWPORT NEWS NORTH NW  
17 MULBERRY ISLAND SW  
19 NEWPORT NEWS NORTH SW

23 NEWPORT NEWS SOUTH NW

MULBERRY ISLAND SE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 18 OF 40

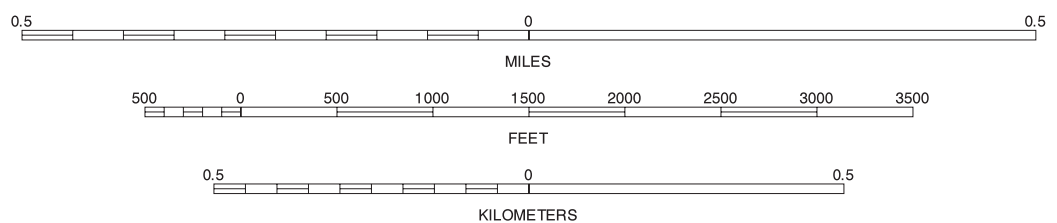
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.



QUARTER QUADRANGLE  
LOCATION

*Joins sheet 23, Newport News South NW*

SCALE 1:12000



12	13	14	12 MULBERRY ISLAND NE 13 NEWPORT NEWS NORTH NW
18		20	14 NEWPORT NEWS NORTH NE 18 MULBERRY ISLAND SE 20 NEWPORT NEWS NORTH SE
	23	24	23 NEWPORT NEWS SOUTH NW 24 NEWPORT NEWS SOUTH NE

INDEX TO ADJOINING 3.75 MAPS

NEWPORT NEWS NORTH SW, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 19 OF 40

Soil map delineations extending beyond the dashed white quadrangle neckline are for reference only and are included on adjacent map sheets.

Joins sheet 24, South NE  
Newport News



Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

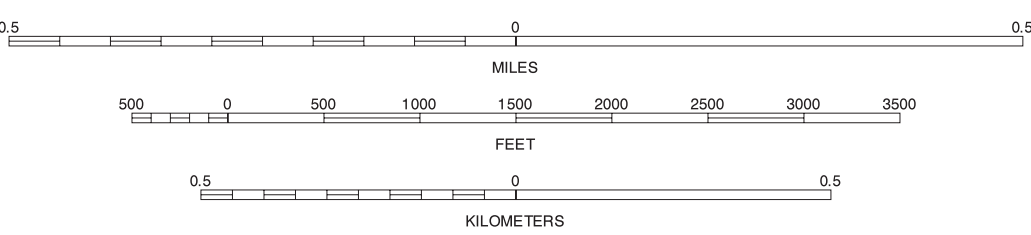
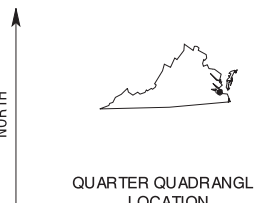
13	14	15
19	20	21
23	24	25

INDEX TO ADJOINING 3.75 MAPS



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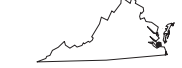
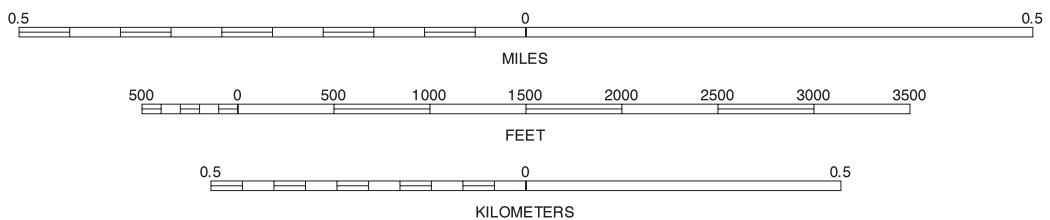
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.







SCALE 1:12000



QUARTER QUADRANGLE  
LOCATION

14	15	16
20	21	22
24	25	26

INDEX TO ADJOINING 3.75 MAPS

HAMPTON SW, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 21 OF 40

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1984-1995 aerial photography. Culture information was acquired from Natural Resources Conservation Service. The Cultural layer was edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



Joins sheet 16, Hampton NE



Joins sheet 21, Hampton SW

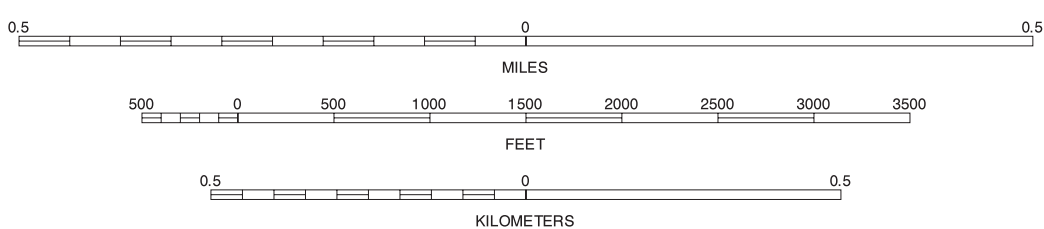
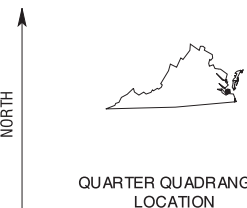
Joins sheet 25, Norfolk North NW

Joins sheet 26, Norfolk North NE

Joins sheet 27, Little Creek NW

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1984-1995 aerial photography. Culture information was acquired from Natural Resources Conservation Service. The Cultural layer was edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



15	16	15 HAMPTON NW 16 HAMPTON NE
21		21 HAMPTON SW
25	26	25 NORFOLK NORTH NW 26 NORFOLK NORTH NE 27 LITTLE CREEK NW

INDEX TO ADJOINING 3.75 MAPS

HAMPTON SE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 22 OF 40

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

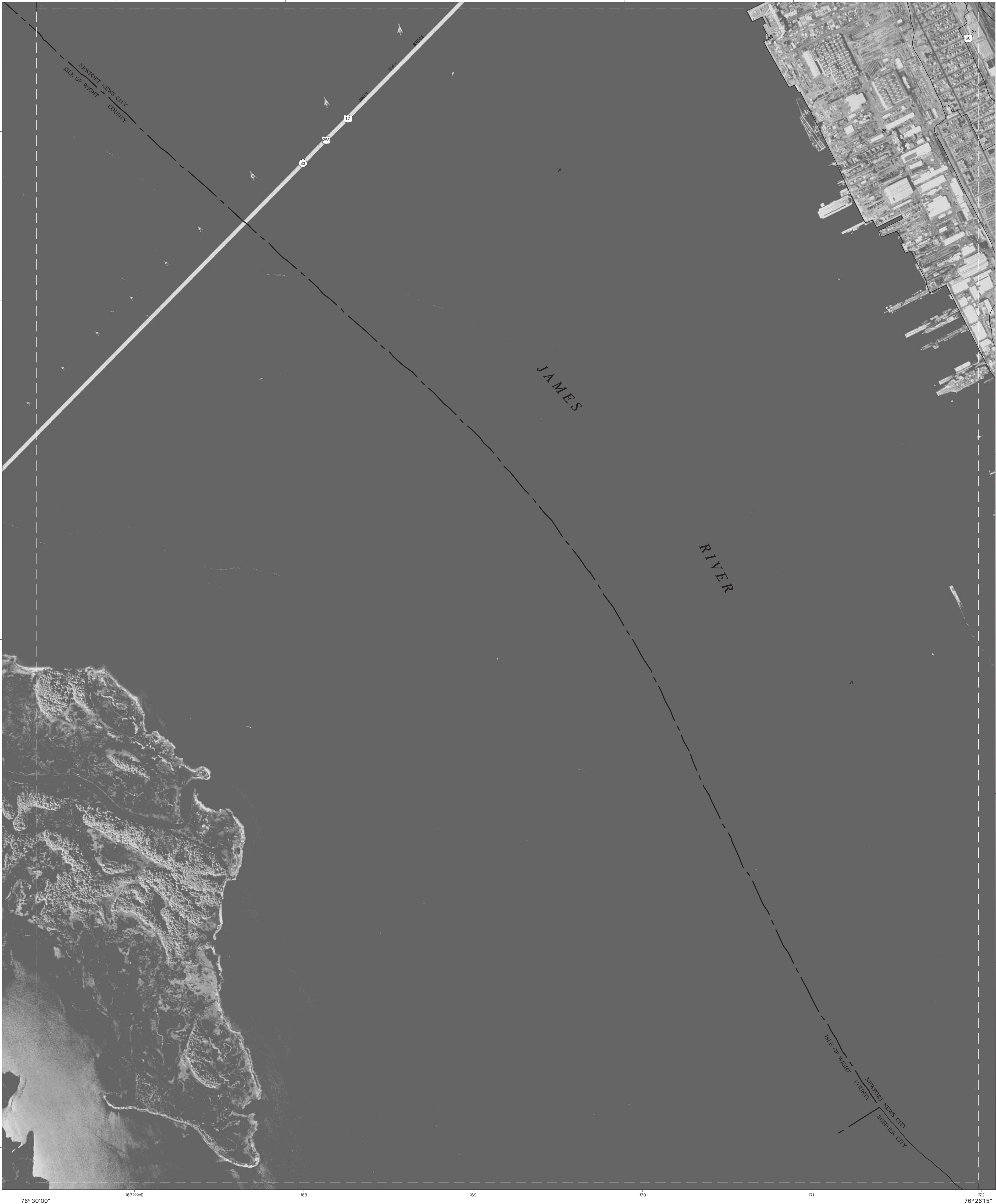


Joins sheet 19, Newport News North SW

Joins sheet 20, Newport News North SE

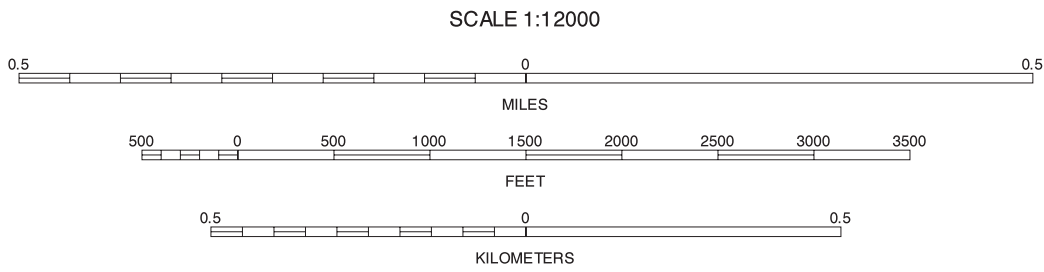
Joins sheet 24, Newport News South NE

Joins sheet 28, Newport News South SE



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



18	19	20
		24
		28

INDEX TO ADJOINING 3.75 MAPS

NEWPORT NEWS SOUTH NW, (OVERSIZED) VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 23 OF 40

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.



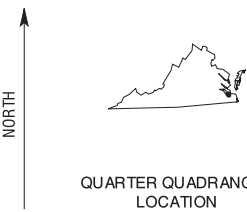


Joins sheet 23, Newport News South NW

Joins sheet 25, Norfolk North NW

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1994-1995 aerial photography. Culture information was acquired from Natural Resources Conservation Service. The Cultural layer was edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

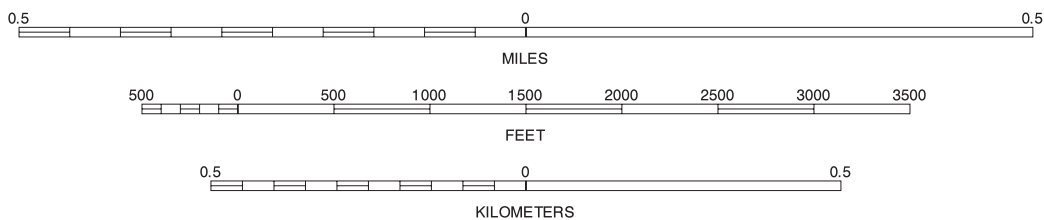
North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE  
LOCATION

Joins sheet 28, Newport News South SE

SCALE 1:12000



19	20	21	19 NEWPORT NEWS NORTH SW
			20 NEWPORT NEWS NORTH SE
23		25	21 HAMPTON SW
			23 NEWPORT NEWS SOUTH NW
			25 NORFOLK NORTH NW
	28	29	28 NEWPORT NEWS SOUTH SE
			29 NORFOLK NORTH SW

INDEX TO ADJOINING 3.75 MAPS

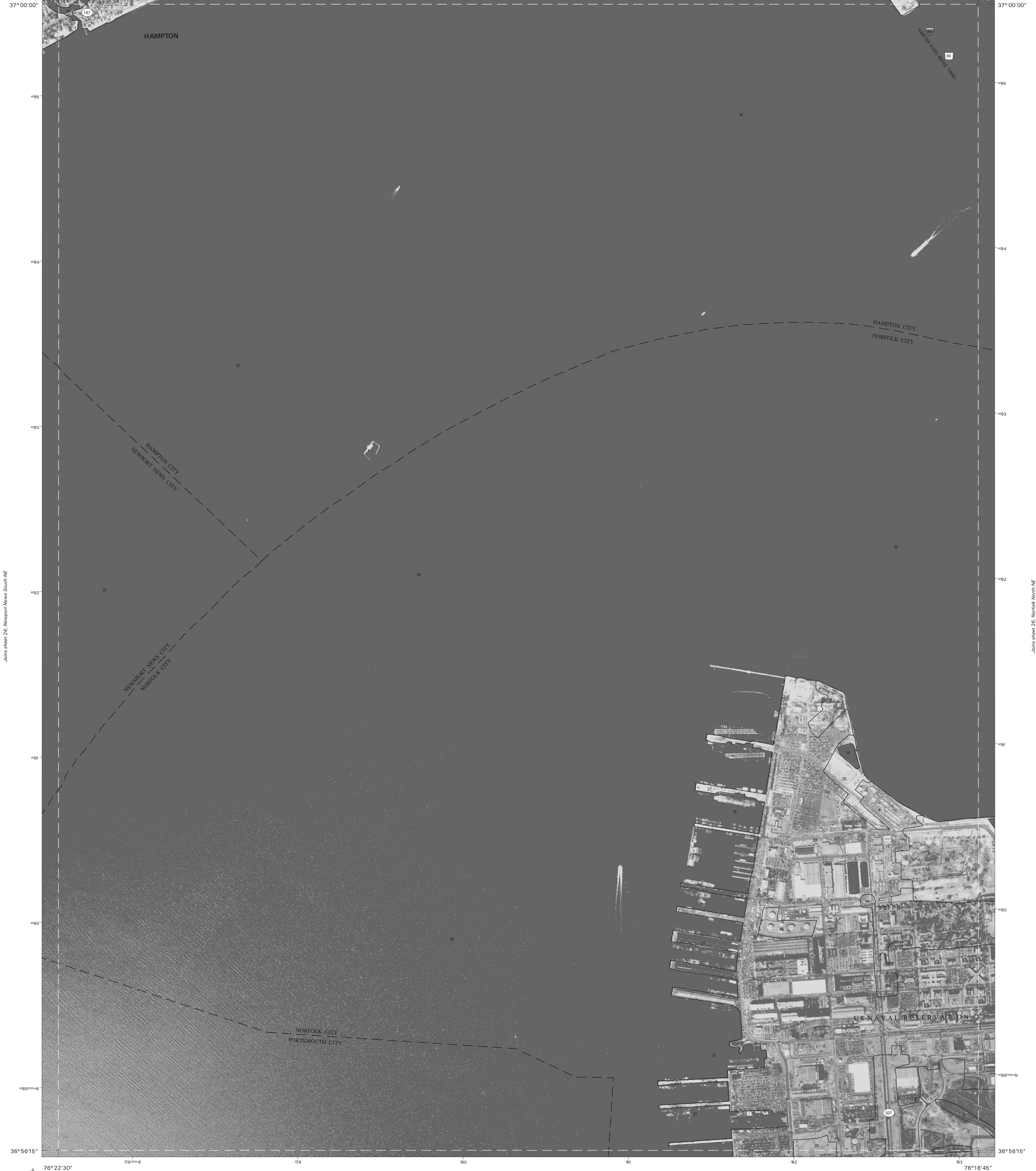
NEWPORT NEWS SOUTH NE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 24 OF 40

Soil map delineations extending beyond the dashed white quadrangle nealines are for reference only and are included on adjacent map sheets.

Joins sheet 29, Norfolk North SW

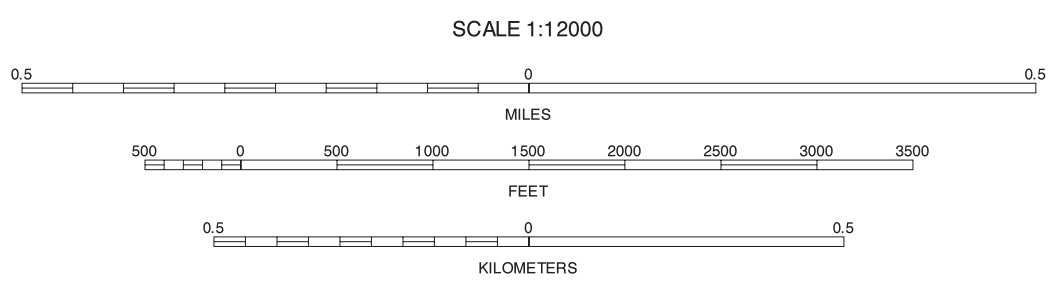
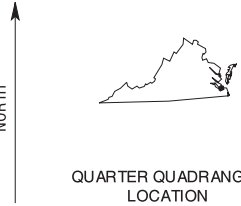


Joins sheet 21, Hampton SW



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



20	21	22	20 NEWPORT NEWS NORTH SE
			21 HAMPTON SW
			22 HAMPTON SE
24		26	24 NEWPORT NEWS SOUTH NE
			25 NORFOLK NORTH NE
			26 NEWPORT NEWS SOUTH SE
28	29	30	28 NORFOLK NORTH SW
			29 NORFOLK NORTH SE
			30 NORFOLK NORTH SE

NORFOLK NORTH NW, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 25 OF 40

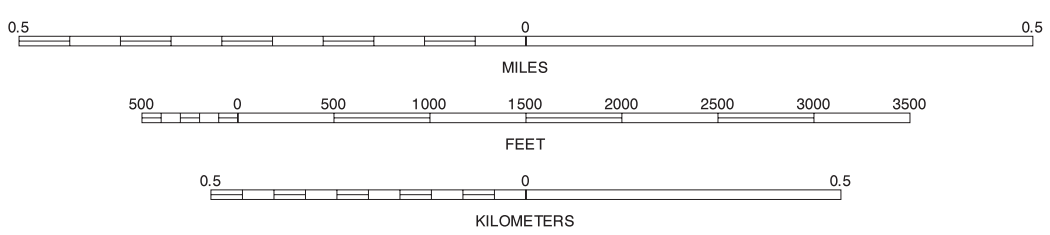
Soil map delineations extending beyond the dashed white quadrangle neckline are for reference only and are included on adjacent map sheets.





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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



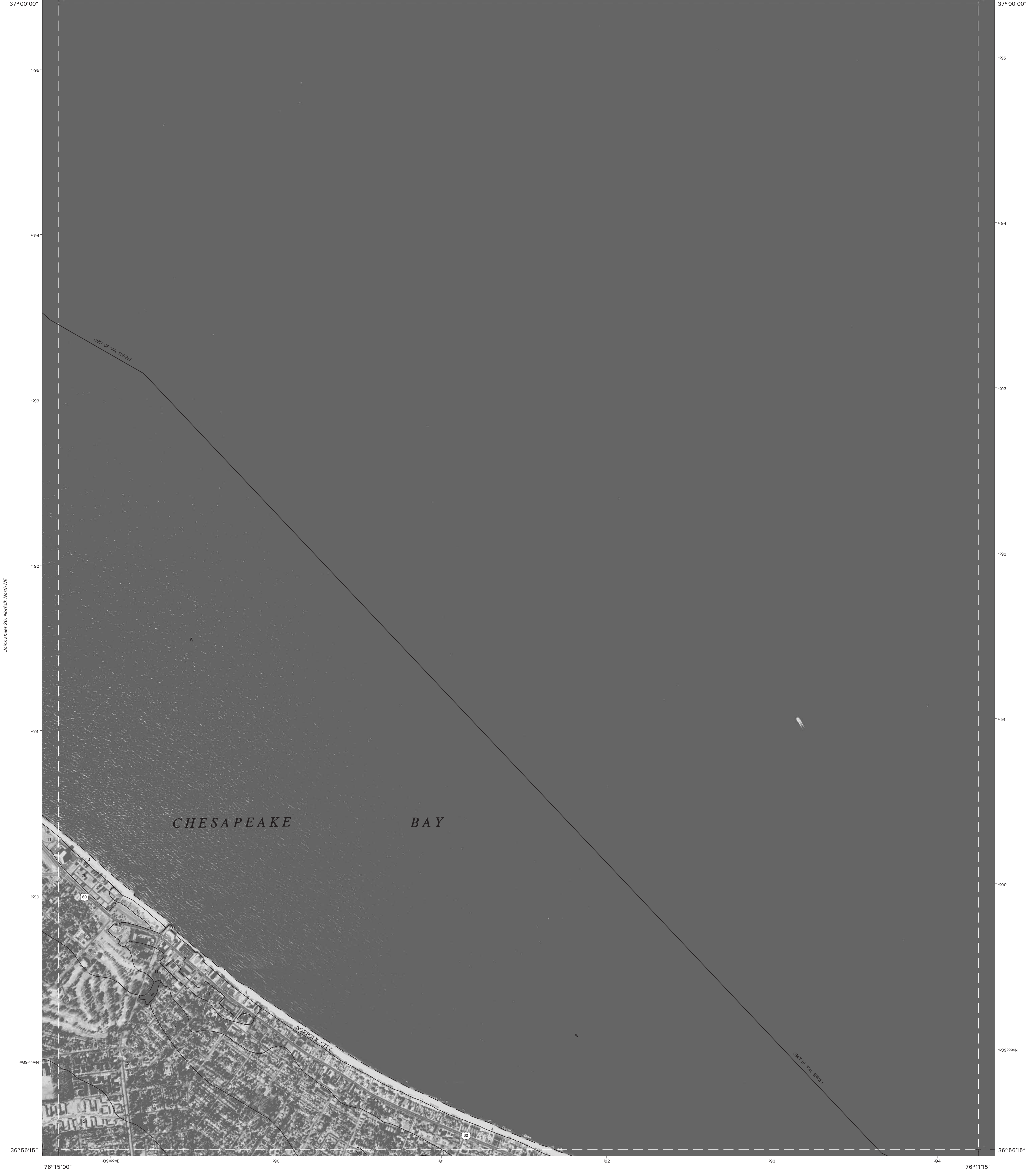
21	22	21 HAMPTON SW 22 HAMPTON SE
25	27	25 NORFOLK NORTH NW 27 LITTLE CREEK NW 29 NORFOLK NORTH SW 30 NORFOLK NORTH SE 31 LITTLE CREEK SW
29	30	

INDEX TO ADJOINING 3.75 MAPS

NORFOLK NORTH NE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 26 OF 40

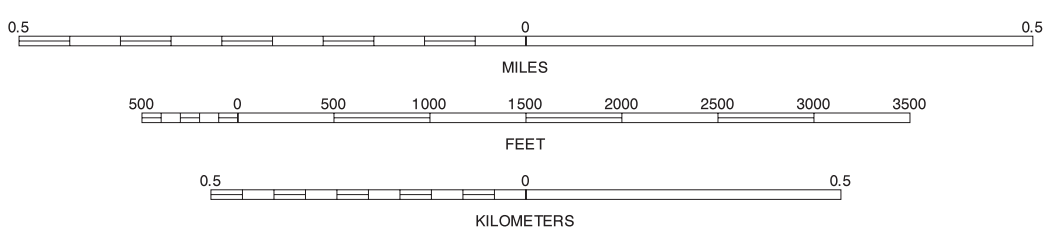
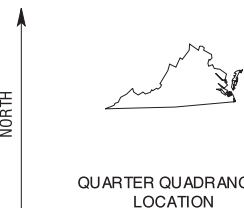
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.





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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



22		22 HAMPTON SE
26		26 NORFOLK NORTH NE
30	31	30 NORFOLK NORTH SE 31 LITTLE CREEK SW 32 LITTLE CREEK SE

LITTLE CREEK NW, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 27 OF 40

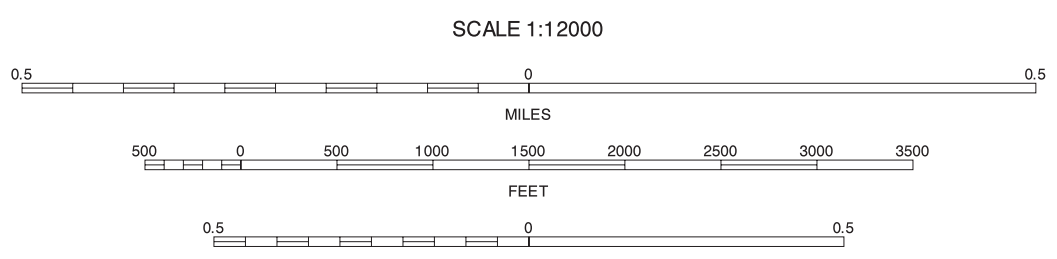
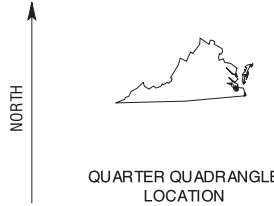
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.





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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



23	24	25	23 NEWPORT NEWS SOUTH NW 24 NEWPORT NEWS SOUTH NE 25 NORFOLK NORTH NW
		29	29 NORFOLK NORTH SW
	33	34	33 BOWERS HILL NE 34 NORFOLK SOUTH NW

INDEX TO ADJOINING 3.75 MAPS

NEWPORT NEWS SOUTH SE, (OVERSIZED) VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 28 OF 40

Soil map delineations extending beyond the dashed white quadrangle headline are for reference only and are included on adjacent map sheets.





Joins sheet 33,  
Bowers Hill NE

Quarter Quadrangle Location

SCALE 1:12000

The image displays three horizontal scale bars. The top bar is labeled 'MILES' and has a scale from 0 to 0.5 with major tick marks every 0.1 units. The middle bar is labeled 'FEET' and has a scale from 0 to 3500 with major tick marks every 500 units. The bottom bar is labeled 'KILOMETERS' and has a scale from 0 to 0.5 with major tick marks every 0.1 units. All three bars are marked with alternating light and dark gray segments.

0.5 0 0.5

MILES

500 0 500 1000 1500 2000 2500 3000 3500

FEET

0.5 0 0.5

KILOMETERS

INDEX TO ADJOINING 3.75 MAPS

Joins sheet 35.  
Norfolk South A.

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.



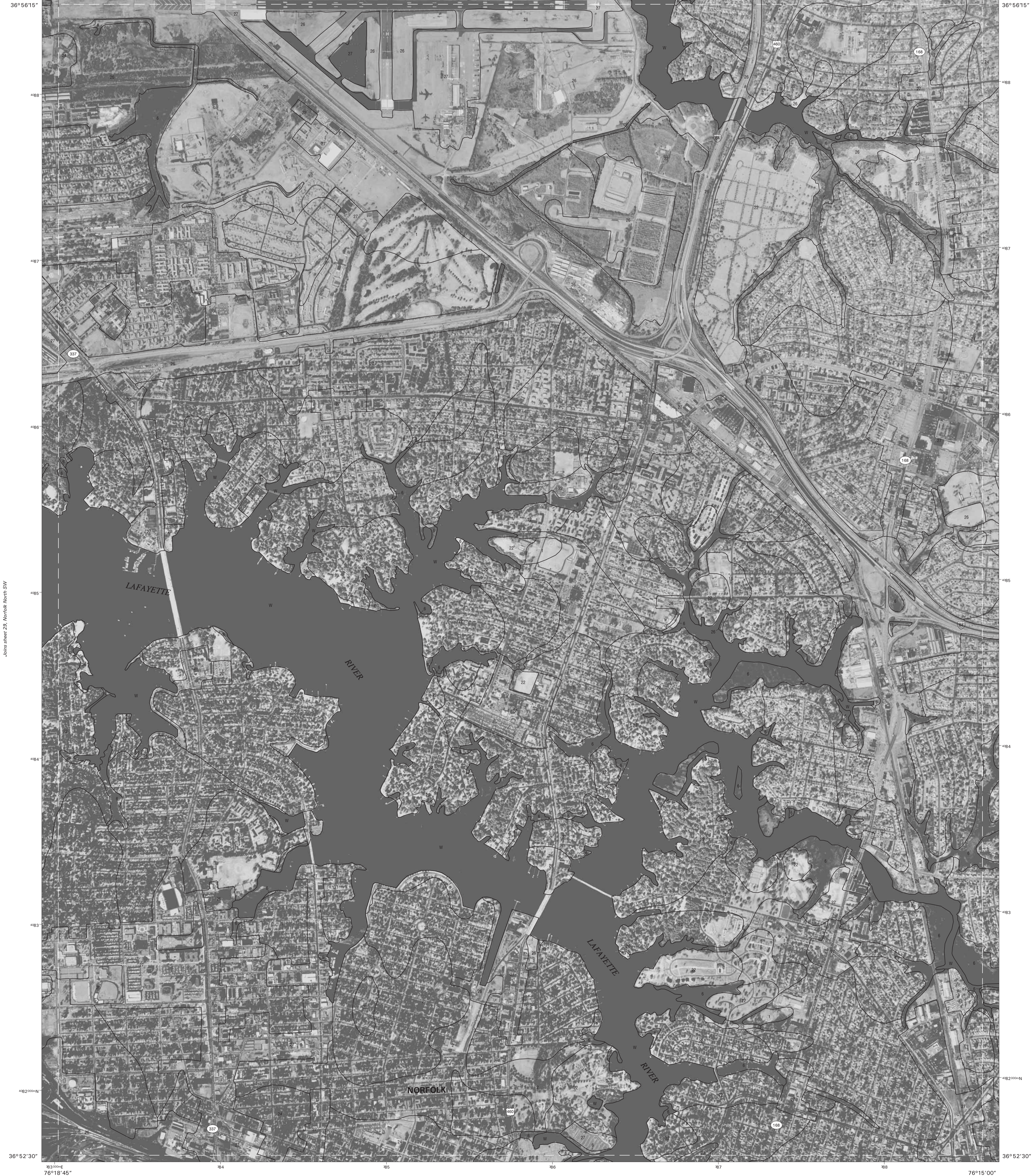
Joins sheet 25  
Norfolk North NW

UNITED STATES  
DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE  
76°18'45"

Joins sheet 26, Norfolk North NE

TIDEWATER CITIES AREA, VIRGINIA  
NORFOLK NORTH SE QUADRANGLE  
SHEET NUMBER 30 OF 40  
76°15'00"

Joins sheet 27  
Little Creek NW



Joins sheet 29, Norfolk North SW

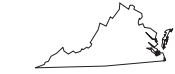
Joins sheet 31, Little Creek SW

Joins sheet 34  
Norfolk South NW

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North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

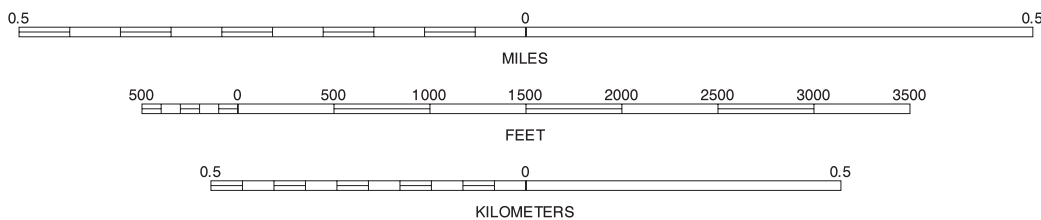
NORTH



QUARTER QUADRANGLE  
LOCATION

Joins sheet 35, Norfolk South NE

SCALE 1:12000



25	26	27	25 NORFOLK NORTH NW
			26 NORFOLK NORTH NE
			27 LITTLE CREEK NW
29		31	28 NORFOLK NORTH SW
			29 LITTLE CREEK SW
			34 NORFOLK SOUTH NW
34	35	36	35 NORFOLK SOUTH NE
			36 KEMPSTOWN NW

INDEX TO ADJOINING 3.75 MAPS

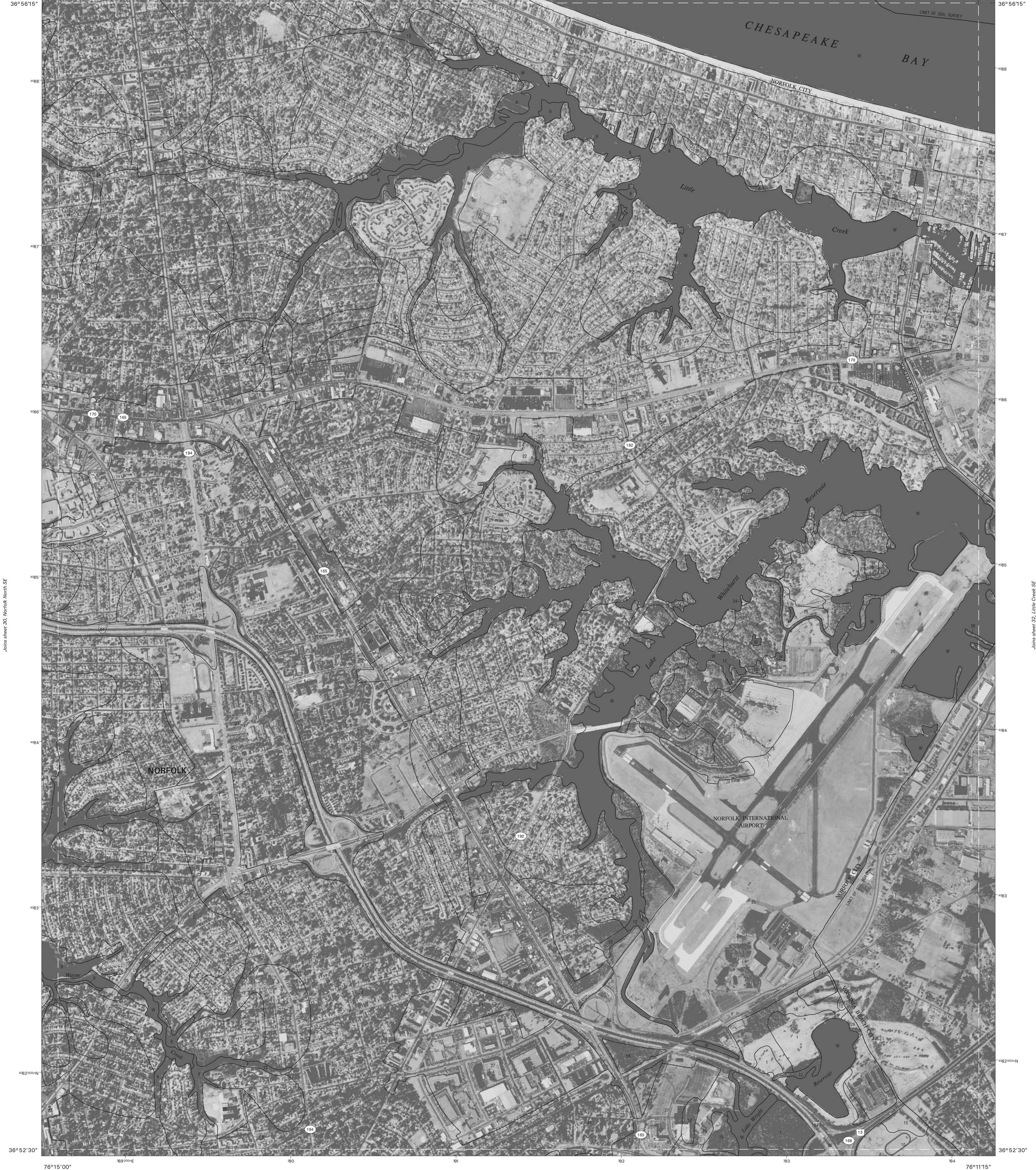
NORFOLK NORTH SE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 30 OF 40

Soil map delineations extending beyond the dashed white quadrangle neeline are for reference only and are included on adjacent map sheets.

Joins sheet 36  
Kempsville NW



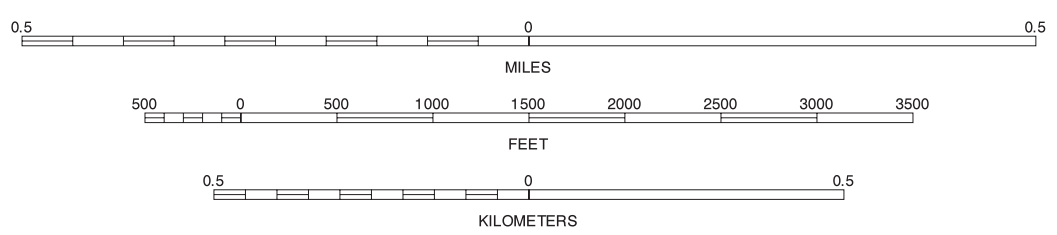
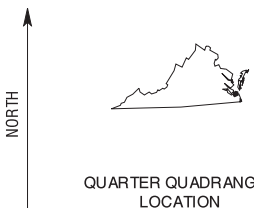
Joins sheet 27, Little Creek NW



Joins sheet 36, Kempsville NW

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North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



26	27	26 NORFOLK NORTH NE 27 LITTLE CREEK NW
30	32	30 NORFOLK NORTH SE 32 LITTLE CREEK SE
35	37	35 NORFOLK SOUTH NE 36 KEMPSVILLE NW 37 KEMPSVILLE NE

INDEX TO ADJOINING 3.75 MAPS

LITTLE CREEK SW, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 31 OF 40

Soil map delineations extending beyond the dashed white quadrangle nealines are for reference only and are included on adjacent map sheets.

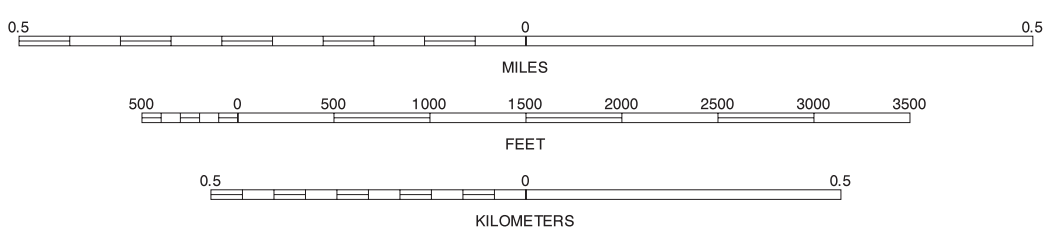
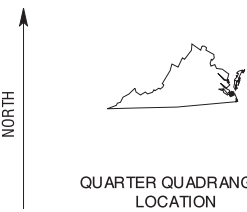
Joins sheet 27, Kempsville NE





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North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



27		27 LITTLE CREEK NW
31		31 LITTLE CREEK SW
36	37	36 KEMPSVILLE NW 37 KEMPSVILLE NE

INDEX TO ADJOINING 3.75 MAPS

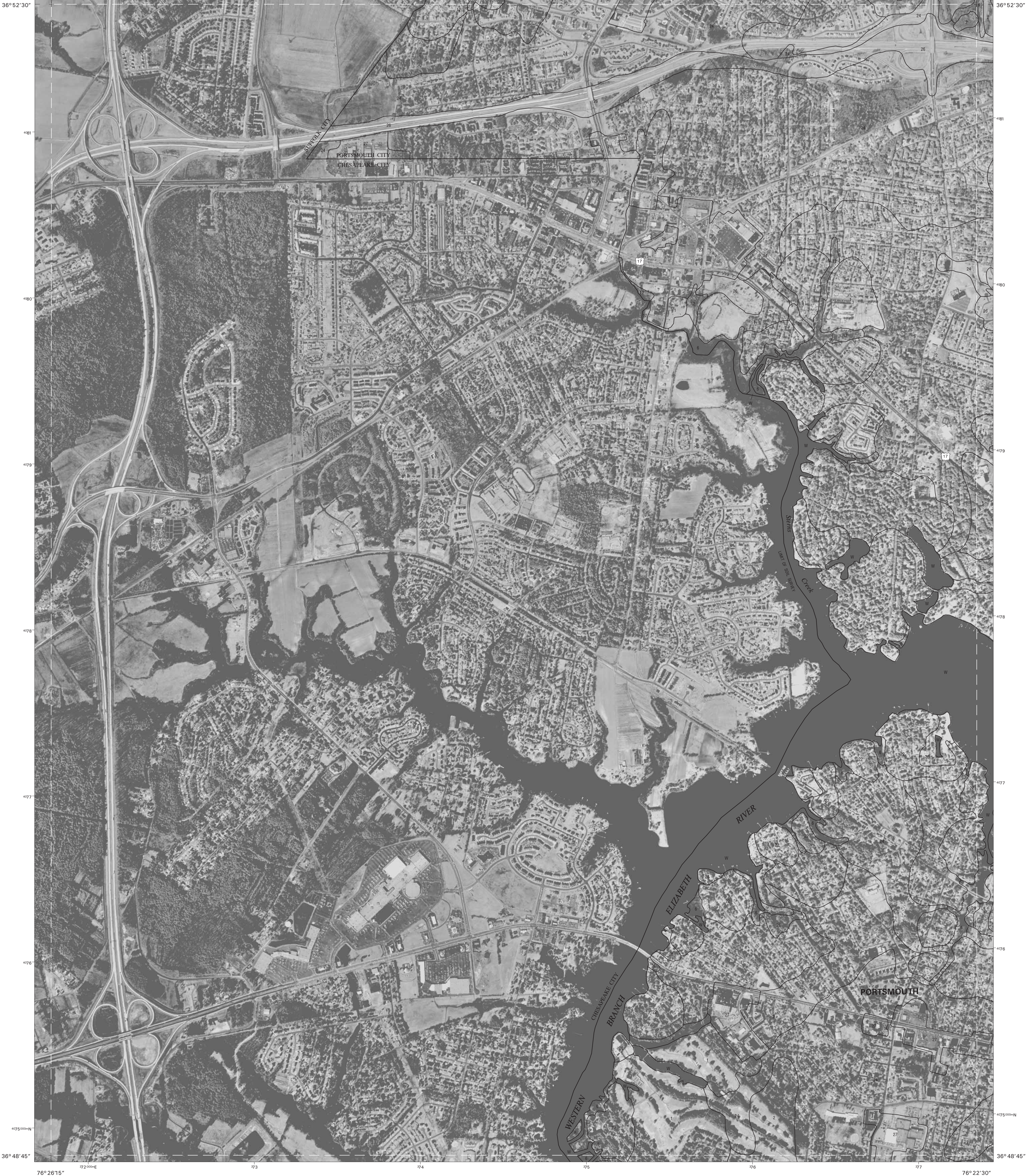
LITTLE CREEK SE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 32 OF 40

Soil map delineations extending beyond the dashed white quadrangle nealines are for reference only and are included on adjacent map sheets.



Joins sheet 28, Newport News South SE

Joins sheet 29  
Norfolk North SW

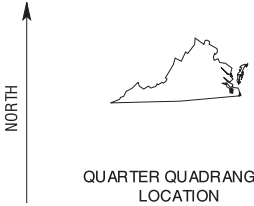


Joins sheet 34, Norfolk South NW

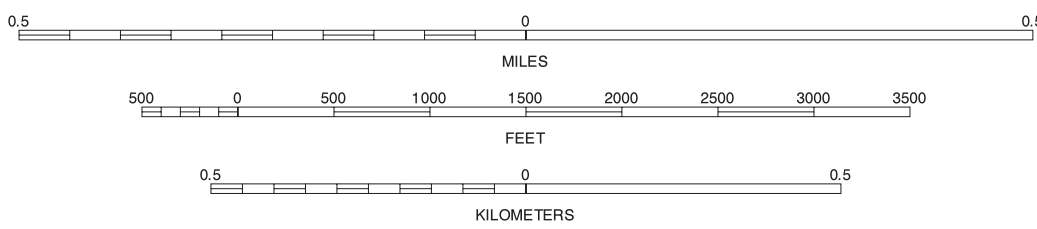
Joins sheet 39  
Norfolk South SW

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North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE LOCATION



Joins sheet 38, Bowers Hill SE

SCALE 1:12000

28	29	28 NEWPORT NEWS SOUTH SE
		29 NORFOLK NORTH SW
	34	34 NORFOLK SOUTH NW
38	39	38 BOWERS HILL SE
		39 NORFOLK SOUTH SW

INDEX TO ADJOINING 3.75 MAPS

BOWERS HILL NE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 33 OF 40

Soil map delineations extending beyond the dashed white quadrangle headline are for reference only and are included on adjacent map sheets.



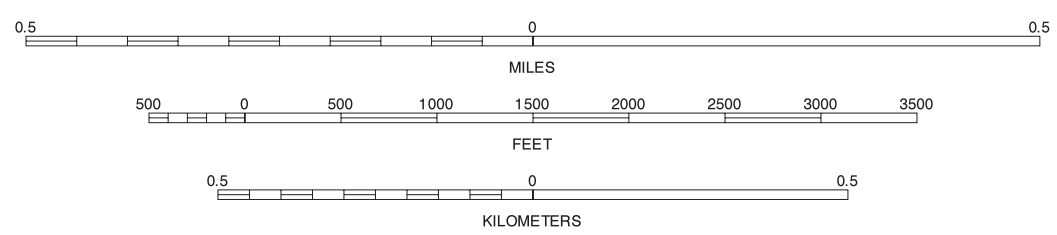
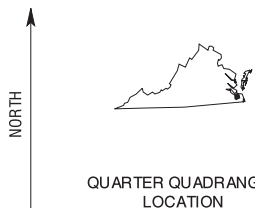
36° 52' 30"  
4081  
4080  
4079  
4078  
4077  
4076  
4075 000m N  
36° 48' 45"  
76° 22' 30"  
778 000m E  
779  
80  
81  
82  
83

36° 52' 30"  
4081  
4080  
4079  
4078  
4077  
4076  
4075 000m N  
36° 48' 45"  
76° 18' 45"  
783



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



28	29	30
33	34	35
38	39	40

INDEX TO ADJOINING 3.75 MAPS

NORFOLK SOUTH NW, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 34 OF 40

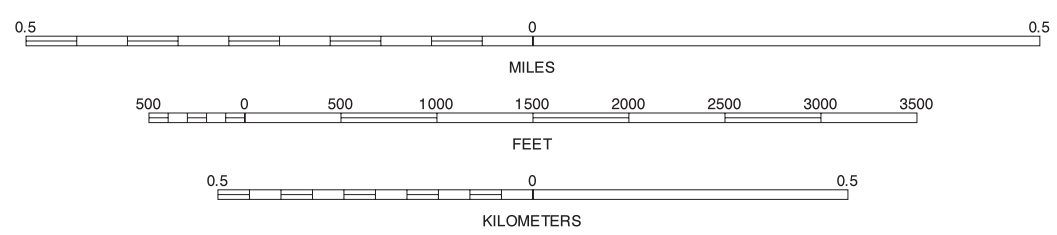
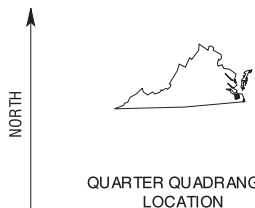
Soil map delineations extending beyond the dashed white quadrangle headline are for reference only and are included on adjacent map sheets.





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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



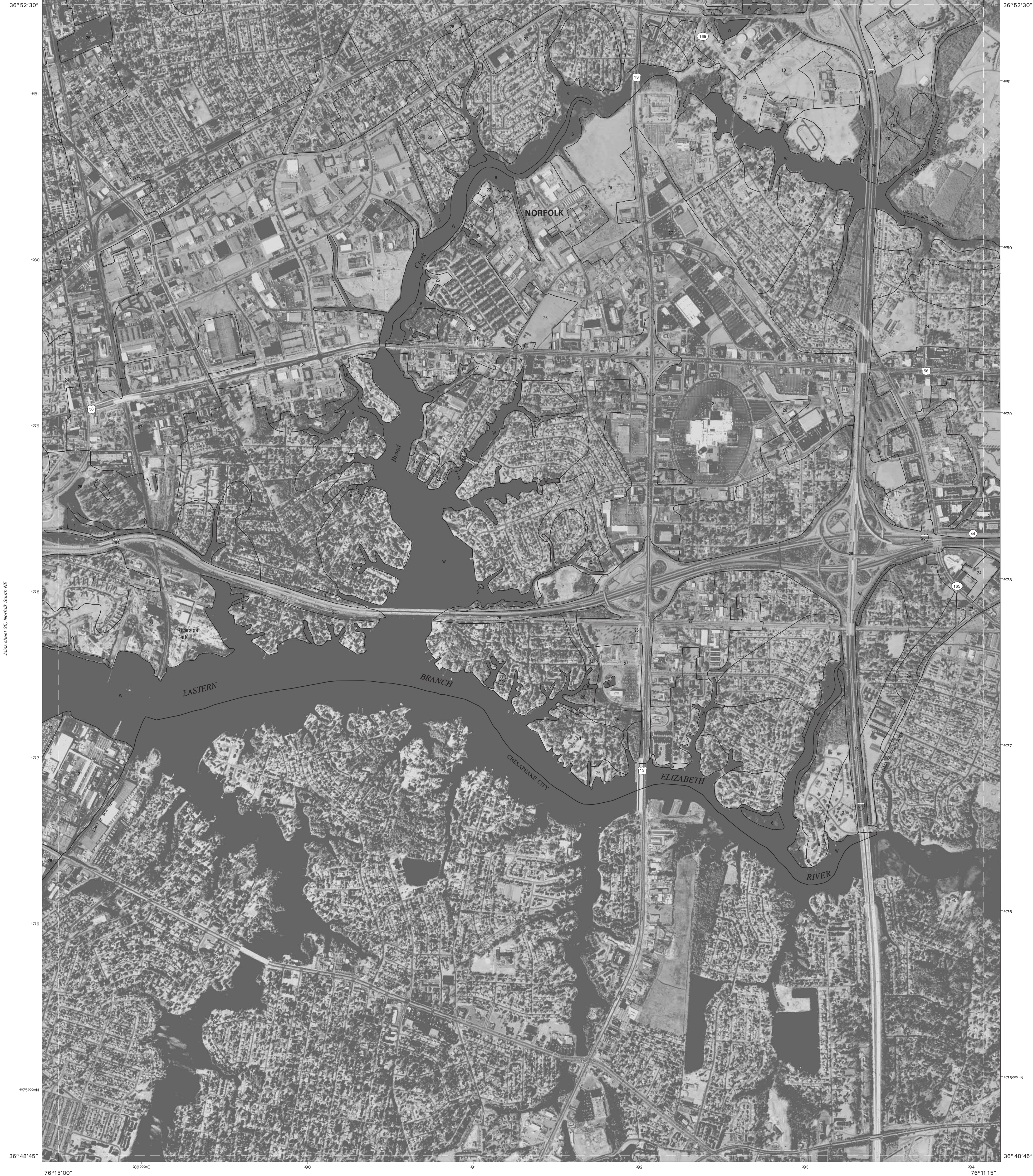
29	30	31	29 NORFOLK NORTH SW
			30 NORFOLK NORTH SE
			31 LITTLE CREEK SW
34		36	34 NORFOLK SOUTH NW
			36 KEMPSVILLE NW
			39 NORFOLK SOUTH SW
39	40		40 NORFOLK SOUTH SE

INDEX TO ADJOINING 3.75 MAPS

NORFOLK SOUTH NE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 35 OF 40

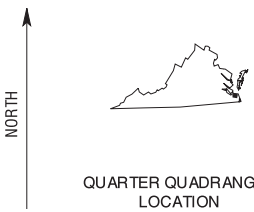
Soil map delineations extending beyond the dashed white quadrangle headline are for reference only and are included on adjacent map sheets.



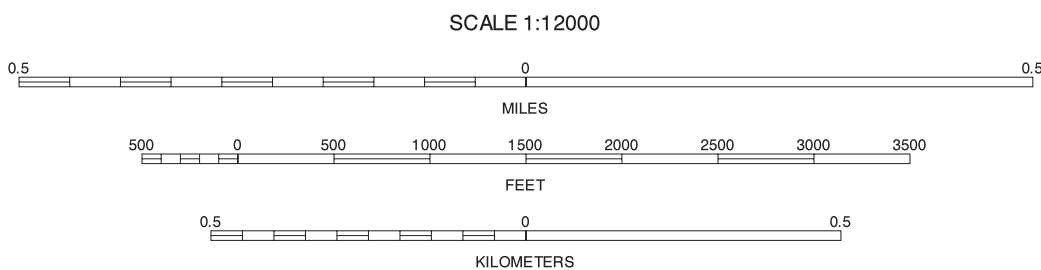


This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1994-1995 aerial photography. Culture information was acquired from Natural Resources Conservation Service. The Cultural layer was edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE  
LOCATION



30	31	32
35	36	37
40		

INDEX TO ADJOINING 3.75 MAPS

KEMPSVILLE NW, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 36 OF 40

Soil map delineations extending beyond the dashed white quadrangle headline are for reference only and are included on adjacent map sheets.

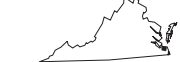




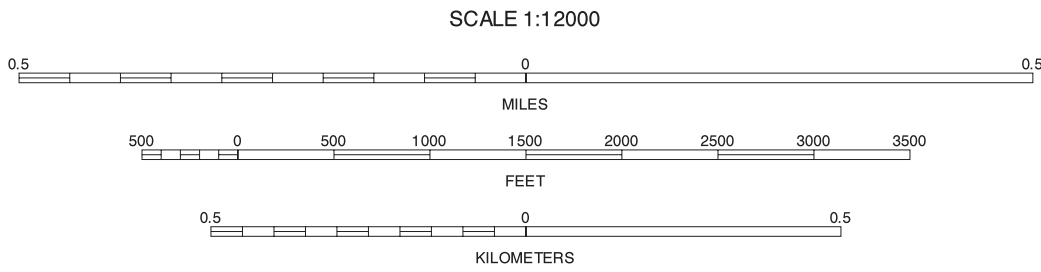
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North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUARTER QUADRANGLE  
LOCATION



31	32	31 LITTLE CREEK SW 32 LITTLE CREEK SE
36		36 KEMPSVILLE NW

INDEX TO ADJOINING 3.75 MAPS

KEMPSVILLE NE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 37 OF 40

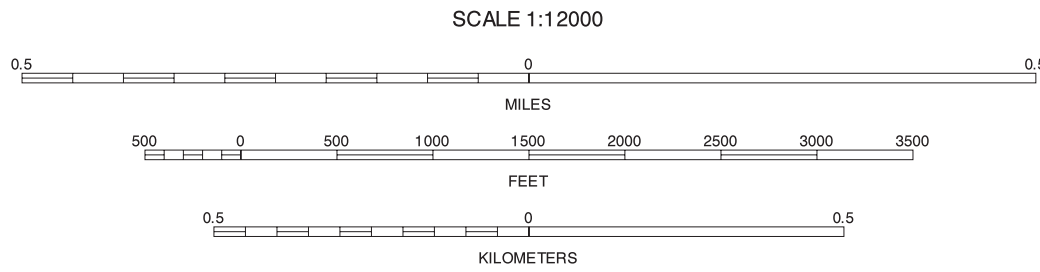
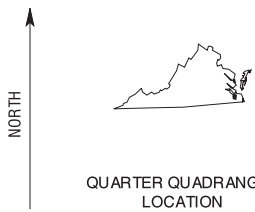
Soil map delineations extending beyond the dashed white quadrangle headline are for reference only and are included on adjacent map sheets.





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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks; Universal Transverse Mercator, zone 18. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



	33	34	33 BOWERS HILL NE
			34 NORFOLK SOUTH NW
		39	39 NORFOLK SOUTH SW

INDEX TO ADJOINING 3.75 MAPS

BOWERS HILL SE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 38 OF 40

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*Joins sheet 34, Norfolk South NW*



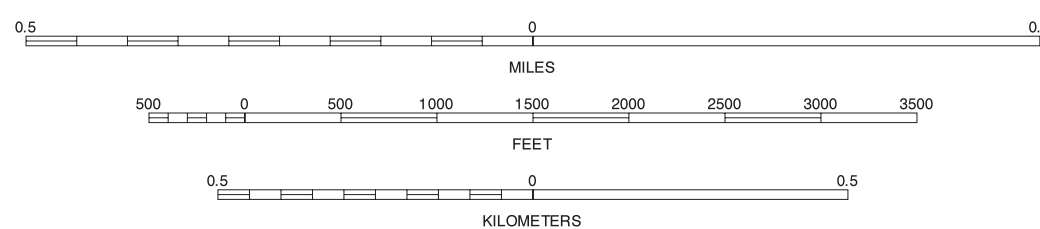
Joins sheet 40. Norfolk South SE

NORTH



QUARTER QUADRANGLE

SCALE 1:12000



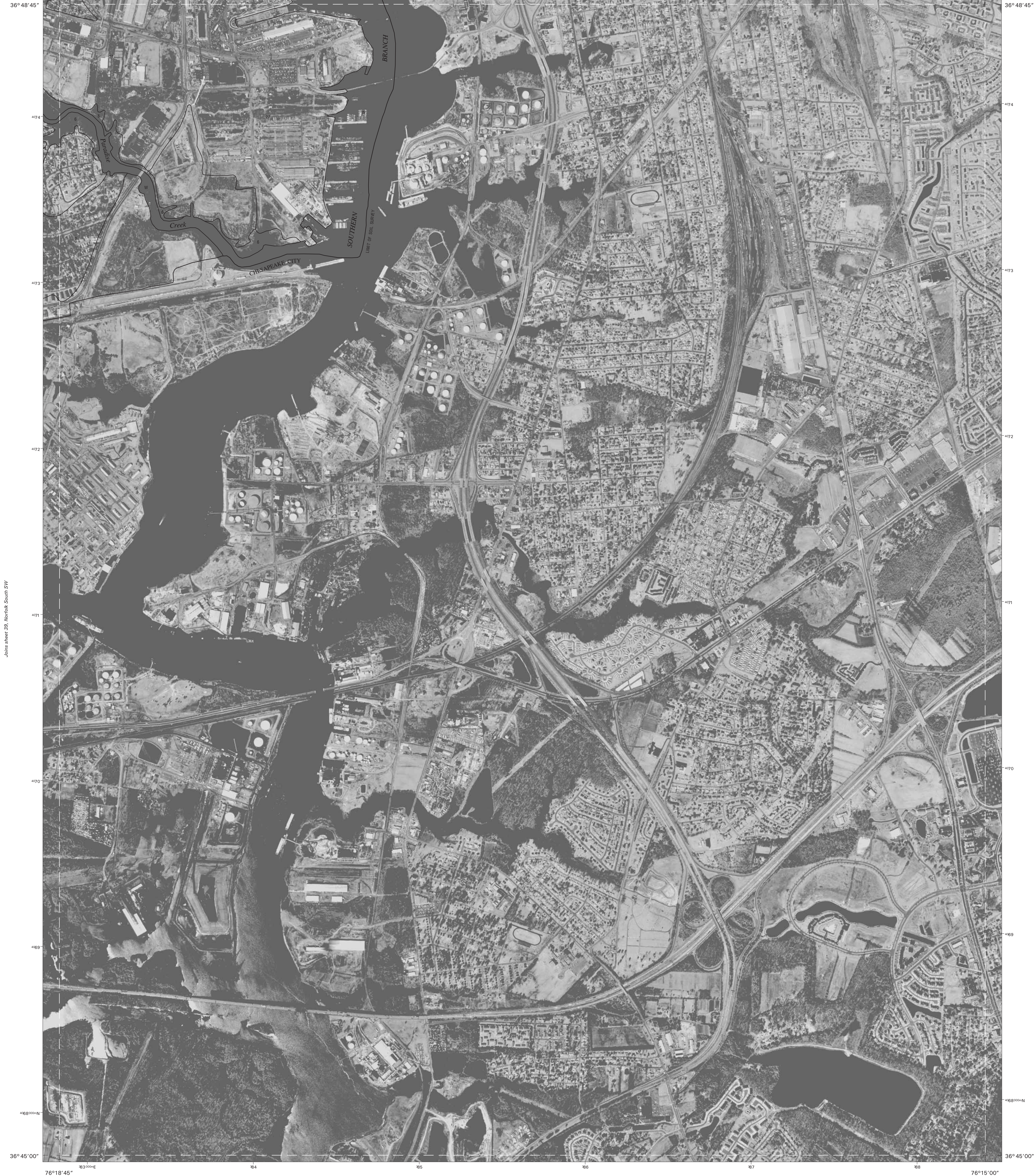
33	34	35	33 BOWERS HILL NE 34 NORFOLK SOUTH NW 35 NORFOLK SOUTH NE
38		40	38 BOWERS HILL SE 40 NORFOLK SOUTH SE

INDEX TO ADJOINING 3.75 MAPS

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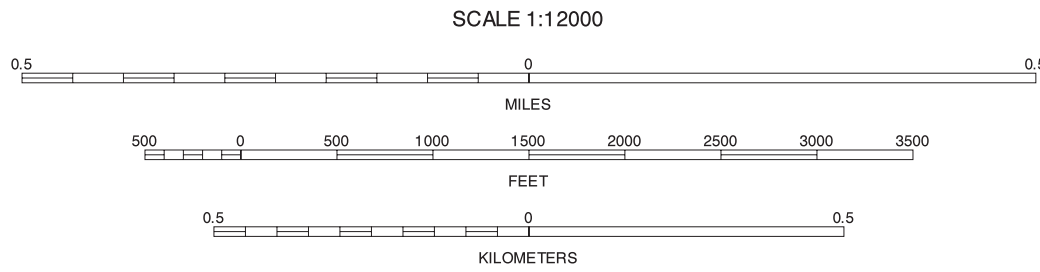
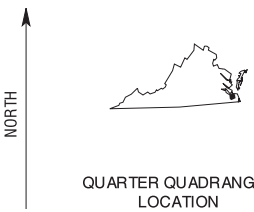
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34	35	36
39		

34 NORFOLK SOUTH NW  
35 NORFOLK SOUTH NE  
36 KEMPSTOWN NW  
39 NORFOLK SOUTH SW

INDEX TO ADJOINING 3.75 MAPS

NORFOLK SOUTH SE, VIRGINIA  
3.75 MINUTE SERIES  
SHEET NUMBER 40 OF 40

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